Northern Arizona University

Student Athlete High Performance Center, Building 73A

1650 South San Francisco Street
FLAGSTAFF, ARIZONA 86011 (SAHPC-73A)
NAU Project: 09.731.191

CONSTRUCTION DOCUMENTS

INDEX OF DRAWINGS
06.22.2020 REVISED AS ASI03 09.04.2020

ASI05

ASI05

ALTERNATE BID ITEMS

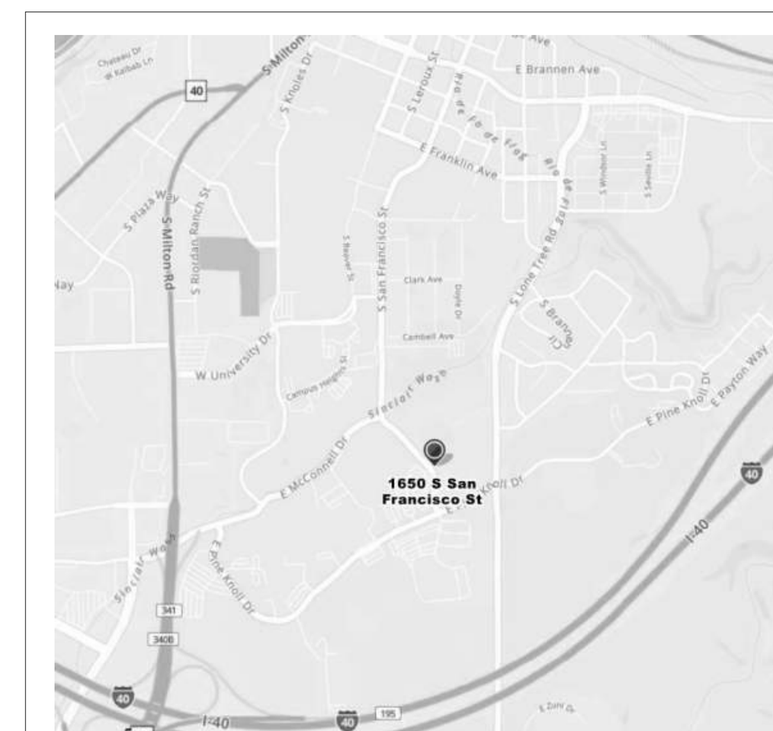
ALTERNATE NO. 1.1	AUDITORIUM FOLDING PARTITION
ALTERNATE NO. 1.2	ENTRY PATIO
ALTERNATE NO. 1.3	ROOF TOP PATIO
ALTERNATE NO. 1.4	SNOW MELT SYSTEM
ALTERNATE NO. 1.5	FOLDING DOOR

DELEGATED DESIGN DEFFERED APPROVAL ITEMS:

THE FOLLOWING ITEMS ARE NOT COVERED BY THIS SET OF DRAWINGS AND SHALL BE DESIGNED BY OTHERS. CALCULATIONS AND DRAWINGS SIGNED BY AN ENGINEER LICENSED IN THE STATE OF ARIZONA SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR REVIEW AND TO THE AHJ FOR APPROVAL WHERE REQ'D BY THE BUILDING OFFICIAL. INSTALLATION OF THESE ITEMS SHALL NOT BE ALLOWED UNTIL APPROVAL IS OBTAINED.

- CONCRETE MIX DESIGNS FOR CONCRETE WITH SPECIFIED f'c OVER 5000 PSI.
- COLD FORMED METAL FRAMING.
- METAL STAIRS - SUPPORT FOR STAIRS SHALL NOT BE PROVIDED FROM PARTITION WALLS.
- CEMENTITIOUS FIREPROOFING MINIMUM THICKNESSES TO ACHIEVE FIRE-RESISTIVE RATINGS.
- EXPANSION JOINT ASSEMBLY ATTACHMENTS AND MINIMUM 45 LB WIND LOAD.
- GLAZED ALUMINUM CURTAIN WALL.
- GLASS GLAZING AT FRAMELESS OFFICE ENTRIES, CALCS PER ASTM E1300.
- NON-STRUCTURAL METAL FRAMING.
- METAL SUSPENSION SYSTEMS.
- ELEVATORS AND ELEVATOR SUPPORT FRAMING.
- FIRE PROTECTION SYSTEM.
- WALK-IN COOLERS: PROVIDE STRUCTURAL DESIGN OF ENCLOSURE.
- ANCHORAGE FOR ALL M.E.P. EQUIPMENT OVER 400 LBS.

NOTE: DEFERRED APPROVAL ITEMS SHALL COMPLY WITH ALL REQUIREMENTS OUTLINED IN SECTION 014000 QUALITY REQUIREMENTS FOR ALTERNATE BUILDING MATERIALS/PRODUCTS APPROVAL REQUIREMENTS.



LOCATION PLAN (NTS)

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DLR Group

Northern Arizona University - Student Athlete High Performance Center, Building 73A
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CONSTRUCTION DOCUMENTS
06.22.2020

Revisions

RFI32	7/23/20	FOUNDATION DRAIN PIPE
ASI03	09.04.20	TRADES, AHJ REVS
ASI05	10/07/20	TRADES, AHJ REVS

Attachment G1 to ASI05 dated 10/07/20

30-19131-00

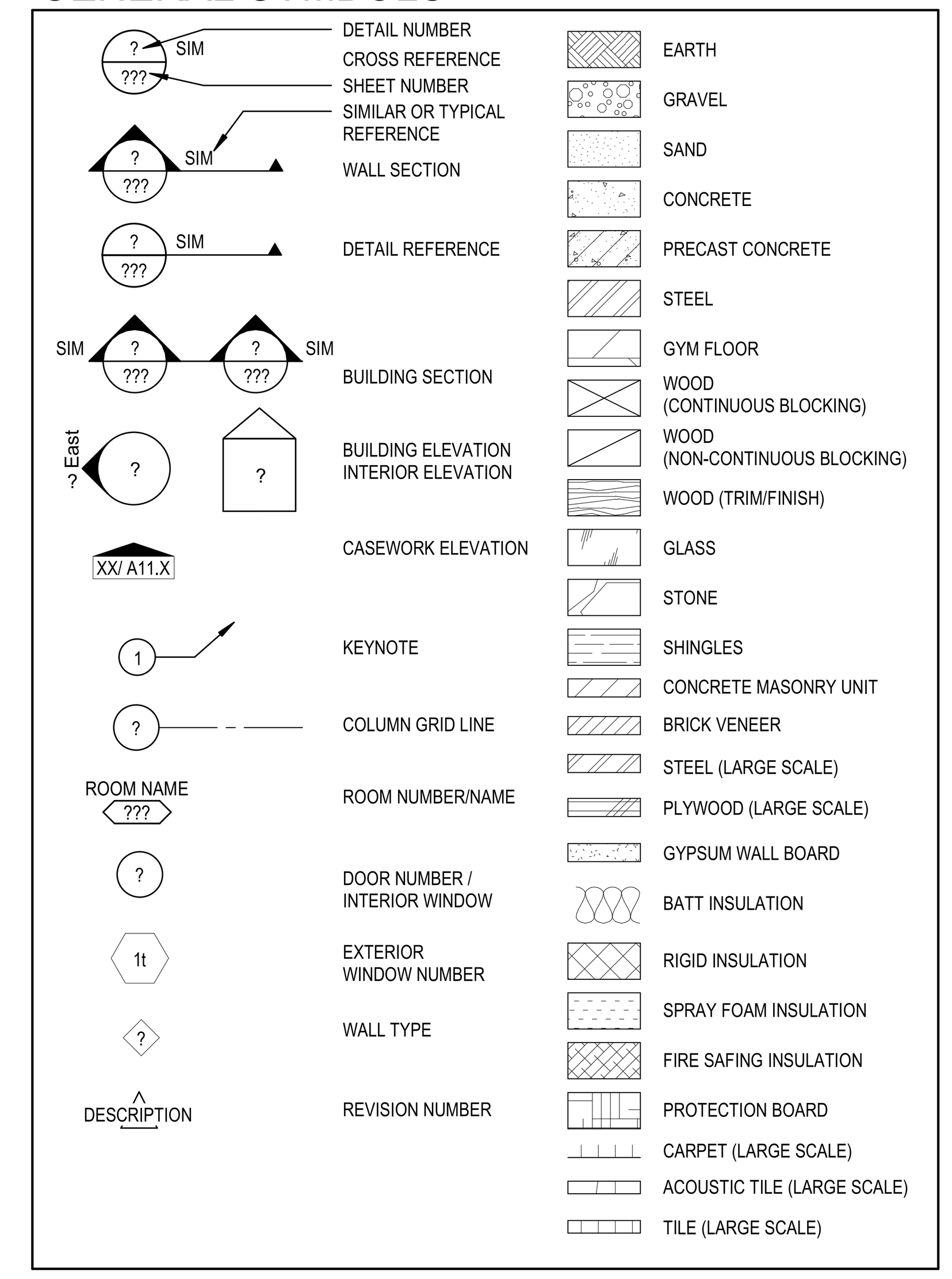
COVER SHEET

0.0

ABBREVIATIONS

#	NUMBER
&	AND
@	AT
AB	ANCHOR BOLT
AB	AIR BARRIER
ABS	ASBESTOS
ACC	ADA ACCESSIBLE
ACR	ACRYLIC
AD	ACCESS DOOR
ADA	AMERICANS WITH DISABILITY ACT
ADDN	ADDITION OR ADDITIONAL
ADJ	ADJUSTABLE
ADJT	ADJACENT
ADMIN	ADMINISTRATION
AEC	AUTOMATED EXTERNAL DEFIBRILLATIORS
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AL	ALUMINUM
ALT	ALTERNATE
ALUM	ALUMINUM
ANCH	ANCHOR
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AP	ACCESS PANEL
APC	ACOUSTIC PANEL CEILING
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ASPH	ASPHALT
AUTO	AUTOMATIC
AVG	AVERAGE
AWP	ACOUSTIC WALL PANEL
B.O.	BOTTOM OF
BAFFLE	CEILING BAFFLE
BCS	BABY CHANGING STATION
BD	BOARD
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BLKHD	BULKHEAD
BM(S)	BEAM(S)
BOT	BOTTOM
BRDG	BRIDGING
BRG	BEARING
BRKT	BRACKET
BSMT	BASEMENT
BTWN	BETWEEN
C	CHANNEL
CAB	CABINET
CANT	CANTILEVER
CAP	CAPACITY
CER	CERAMIC
CF	CUBIC FEET
CFCI	CONTRACTOR FURNISHED CONTRACTOR INSTALLED
CFSF	COLD-FORMED STEEL FRAMING
CG	CLEAR FLOAT GLASS
CG	CORNER GUARD
CI	CAST IRON
CIG	CLEAR INSULATING GLASS
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CJA	CONTROL JOINT ABOVE
CL	CENTER LINE
CLG	CEILING
CLOS	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
COM	COMMON
COMB	COMBINATION
COMM	COMMUNICATIONS
COMPR	COMPRESSIBLE
CONC	CONCRETE
CONF	CONFERENCE
CONFIG	CONFIGURATION
CONN(S)	CONNECTION(S)
CONST	CONSTRUCTION
CONT	CONTINUOUS
CONTR	CONTRACT(OR)
CORR	CORRIDOR
CP	COVER PLATE
CPT	CARPET
CR	CHAIR RAIL
CS	COUNTERSINK
CSTJ	CONSTRUCTION JOINT
CTG	CLEAR TEMPERED FLOAT GLASS
CTIG	CLEAR TEMPERED INSULATING GLASS
CTR	CENTER
CU	COPPER
CU	CUBIC
CU	COMBINATION UNIT
CV	CONDOM VENDOR
CY	CUBIC YARD
CYL	CYLINDER
D	DEPTH
DB	DECIBEL
DBL	DOUBLE
DC	DUST COLLECTOR
DEG	DEGREE
DEMO	DEMOLISH OR DEMOLITION
DEPR	DEPRESS(ION)(ED)
DEPT	DEPARTMENT
DET	DETAIL
DET	DETENTION
DF	DRINKING FOUNTAIN
DF	DECORATIVE GLASS FILM
DG	DOOR GRILLE
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIV	SPECIFICATION DIVISION
DL	DIMENSIONAL LETTERS
DN	DOWN
DPFG	DAMPROFFING
DR	DOOR
DSN	DOWNSPOUT NOZZLE
DW	DISHWASHER
DWG(S)	DRAWING(S)
DWL(S)	DOWEL(S)
DWR	DRAWER
E	EAST
EA	EACH
EA	EACH FACE
EB	EXPANSION BOLT
EC	ELECTRICAL CONTRACTOR
EE	EACH END
EEW	EMERGENCY EYE WASH
EEWS	EMERGENCY EYE WASH SHOWER
EFF	EFFICIENCY
EFG	ENTRANCE FLOOR GRILLE
EJ	EXPANSION JOINT
EL	ELEVATION
ELAS	ELASTOMERIC
ELEC	ELECTRICAL
ELEV	ELEVATOR
EMER	EMERGENCY
ENCL	ENCLOSURE
ENG	ENGINEER
ENTR	ENTRANCE
EQ	EQUAL
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ERF	EPOXY RESIN FLOORING
ERFB	EPOXY RESIN FLOORING BASE
EUI	ENERGY USE INTENSITY
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXP	EXPANSION
EXP	EXPOSED
EXT	EXTERIOR
F	FABRIC
F.O.	FACE OF
F.V.	FIELD VERIFY
FAB	FABRICATE(D)
FB	FACE BRICK
FD	FLOOR DRAIN
FDN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINISH FLOOR
FH	FIRE HYDRANT
FHC	FIRE HOSE CABINET
FIG	FIGURE
FIN	FINISHED
FIX	FIXTURE
FL	FLOOR
FLASH	FLASHING
FLEX	FLEXIBLE
FLG	FLOORING
FLM	FULL LENGTH MIRROR
FLUOR	FLUORESCENT
FO	FINISH OPENING
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOW	FACE OF WALL
FP	FIREPROOFING
FR	FIRE RESISTANT
FRP	FIBERGLASS REINFORCED PANEL
FRT	FIRE RESISTANCE TREATED
FS	FLOOR SINK
FSS	FOLDING SHOWER SEAT
FT	FEET
FTG	FOOTING
FUT	FUTURE
FVC	FIRE VALVE CABINET
FWC	FABRIC WALL COVERING
G	GROUT
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GB	GRAB BAR
GC	GENERAL CONTRACTOR
GD	GARBAGE DISPOSAL
GEN	GENERAL
GFA	GROSS FLOOR AREA
GL	GLUE LAMINATED
GL	GLASS
GMP	GUARANTTED MAXIMUM PRICE
GOVT	GOVERNMENT
GR	GUARD RAIL
GR	GRADE
GRS	GALVANIZED RIGID STEEL
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
H	HEIGHT
HC	HOLLOW CORE
HD	HAND DRYER
HDBD	HARDBOARD
HDR	HEADER
HDWD	HARDWOOD
HDWR	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HPC	HIGH PERFORMANCE COATING
HR	HOUR
HR	HANDRAIL
HS	HARDWARE SET
HSS	HOLLOW STRUCTURAL SHAPE
HVAC	HEATING VENTILATING AND AIR CONDITIONING
HW	HARDWARE
i.e.	THAT IS
IAW	IN ACCORDANCE WITH
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
IF	INSIDE FACE
IJ	ISOLATION JOINT
IJS	IN JOIST SPACE
IN	INCH
INC	INCLUDE(ING)
INSUL	INSULATION
INT	INTERIOR
JAN	JANITOR
JCT	JUNCTION
JFB	JOINT FILLER BOARD
JST	JOIST
JT	JOINT
KCJ	KEYED CONSTRUCTION JOINT
KD	KNOCKDOWN
KH	KITCHEN HOOD
KIT	KITCHEN
L	ANGLE
LAB	LABORATORY
LAM	LAMINATED
LAV	LAVATORY
LB(S)	POUND(S)
LBR	LUMBER
LDG	LOADING
LF	LINEAR FOOT
LG	LENGTH (LONG)
LG	LAMINATED GLASS
LIN	LINEAR
LINO	LINOLEUM
LKR	LOCKER
LOC	LOCATION
LONG	LONGITUDINAL
LSC	LIFE SAFETY CODE
LTG	LIGHTING
LV	LOUVER
LVT	LUXURY VINYL TILE
LWC	LIGHT WEIGHT CONCRETE
M	THOUSAND
MAG	MAGNETIC
MAINT	MAINTENANCE
MAN	MANUAL
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MB	MOP BASIN
MBD	MARKER BOARD
MBH	MOP/BROOM HOLDER
MC	MEDICINE CABINET
MECH	MECHANICAL
MEMB	MEMBRANE
MEZZ	MEZZANINE
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MR/S	MIRROR WITH SHELF
MTD	MOUNTED
MTG	MOUNTING
MUL	MULLION
N	NORTH
NA	NOT APPLICABLE
NC	NOISE CRITERIA
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NOM	NOMINAL
NTS	NOT TO SCALE
NWC	NORMAL WEIGHT CONCRETE
O to O	OUT TO OUT
OA	OVERALL
OC	ON CENTER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OFF	OFFICE
OFOI	OWNER FURNISHED OWNER INSTALLED
OPG(S)	OPENING(S)
OPP	OPPOSITE
OSHA	OPERATIONAL SAFETY AND HEALTH ADMINISTRATION
OTB	OPEN TO BELOW
OVFL	OVERFLOW
OVHD	OVERHEAD
P	PAINT
PAN B	PANIC BOLT
PAR	PARALLEL
PB	PARTICLE BOARD
PC	PRECAST CONCRETE
PCD	PAPER CUP DISPENSER
PCS	POLISHED CONCRETE SLAB
PCT	PORCELAIN CERAMIC TILE
PD	PANIC DEVICE
PENT	PENTHOUSE
PERF	PERFORATED
PERP	PERPENDICULAR
PG	PATTERN GLASS
PIC	PORTABLE INSTRUMENT CONNECTION
PIG	PATTERN INSULATING GLASS
PL	PLATE
PL	PROPERTY LINE
PL	PLASTIC LAMINATE
PLBG	PLUMBING
PLYWD	PLYWOOD
PR	PAIR
PREFAB	PREFABRICATED
PROJ	PROJECT(OR) (ION)
PS	PROJECTION SCREEN
PT	POINT
PTD	PAPER TOWEL DISPENSER
PTD/R	COMBINATION TOWEL DISPENSER/RECEPTACLE
PTN	PARTITION
PVC	POLYVINYL CHLORIDE
PWL	SOUND POWER LEVEL
QS	QUARTZ SURFACE
QTR RND	QUARTER ROUND
QTY	QUANTITY
RAD	RADIUS
RAF	RUBBER ATHLETIC FLOORING
RB	RUBBER BASE
RC	REMOTE CONTROL
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REF	REFERENCE
REFL	REFLECTED
REM	REMOVABLE
REQ(D)	REQUIRE(D)
RESIL	RESILIENT
REV	REVISION(S)
RFM	RECESSED FLOOR MAT
RH	ROBE HOOK
RI&C	ROUGH IN AND CONNECT
RM	ROOM
RMA	RESILIENT MOLDING ACCESSORY
RND	ROUND
RS	ROLLER SHADE
RST	RUBBER STAIR TREAD
RT	RUBBER TILE
S	SOUTH
S	SINK
SAC	SOUND ABSORBING CEILING UNIT
SAT	SPRAYED ACOUSTIC TREATMENT
SB	SPLASH BLOCK
SC	SOLID CORE
SC	SHOWER CURTAIN
SC	SEALED CONCRETE
SCD	SEAT COVER DISPENSER
SCH	SHOWER CURTAIN HOOK
SCHED	SCHEDULE
SCR	SHOWER CURTAIN ROD
SCT	STRUCTURAL CLAY TILE
SD	SOAP DISPENSER
SECT	SECTION
SECY	SECRETARY
SG	SPANDRAL GLASS
SGL	SINGLE
SH	SHOWER
SHM	SECURITY HOLLOW METAL
SHT	SHEET
SIM	SIMILAR
SLNT	SEALANT
SM	SHEET METAL
SND	SANITARY NAPKIN DISPOSAL
SNV	SANITARY NAPKIN VENDOR
SPEC	SPECIFICATION(S)
SPL	SOUND PRESSURE LEVEL
SPL	SPECIAL
SQ	SQUARE
SS	STAINLESS STEEL
SSA	STORM SHELTER AREA
SSM	SOLID SURFACE MATERIAL
SSS	STAINLESS STEEL SHELF
ST	STONE
ST	STAIR
STAG'D	STAGGERED
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STGR	STRINGER
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURAL
SUBFL	SUBFLOOR
SURF	SURFACE
SUSP	SUSPENDED
SYM	SYMETRICAL
T	PORCELAIN OR CERAMIC TILE
T	TREAD
T&G	TONGUE AND GROOVE
T.O.	TOP OF
TAN	TANGENT
TB	TOWEL BAR
TB	PORCELAIN OR CERAMIC TILE BASE
TBD	TACK BOARD
TCP	TOILET COMPARTMENT PARTITION
TEMP	TEMPORARY
TERR	TERRAZZO
TG	TINTED FLOAT GLASS
TH	THRESHOLD
TI	TENANT IMPROVEMENT
TIG	TINTED INSULATING GLASS
TMR	TILT MIRROR UNIT
TOP	TOP OF PAVING
TRANS	TRANSVERSE
TTD	TOILET TISSUE DISPENSER
TTG	TINTED TEMPERED FLOAT GLASS
TTIG	TINTED TEMPERED INSULATING GLASS
TYP	TYPICAL
UL	UNDERWRITERS LABORATORIES
UNEX	UNEXCAVATED
UNFIN	UNFINISHED
UNO	UNLESS NOTED OTHERWISE
UR	URINAL
US	UTILITY SHELF
UTIL	UTILITY
VB	VAPOR BARRIER
VCB	VENTED COVE BASE
VERT	VERTICAL
VEST	VESTIBULE
VOC	VOLITILE ORGANIC COMPOUND
VOL	VOLUME
VP	VENEER PLASTER
VWC	VINYL WALL COVERING
W	WEST
W	WIDE
W/	WITH
W/O	WITHOUT
WAF	WOOD ATHLETIC FLOORING
WB	WOOD BASE
WC	WATER CLOSET
WC	WALL COVERING
WCL	WATER CLOSET/LAVATORY COMBINATION
WD	WOOD
WDF	WOOD FLOORING
WDW	WINDOW
WG	POLISHED WIRE GLASS
WI	WROUGHT IRON
WOM	WALK OFF MAT
WR	WASTE RECEPTACLE
WRB	WEATHER RESISTANT BARRIER
WW	WARM WHITE
WWF	WELDED WIRE FABRIC
YD	YARD

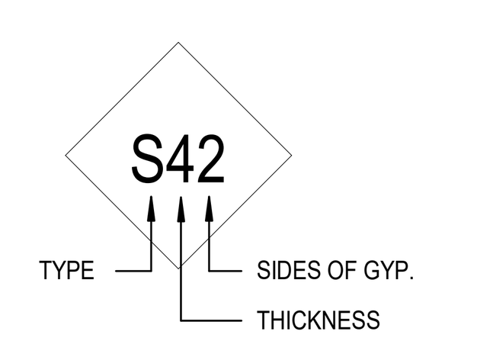
GENERAL SYMBOLS

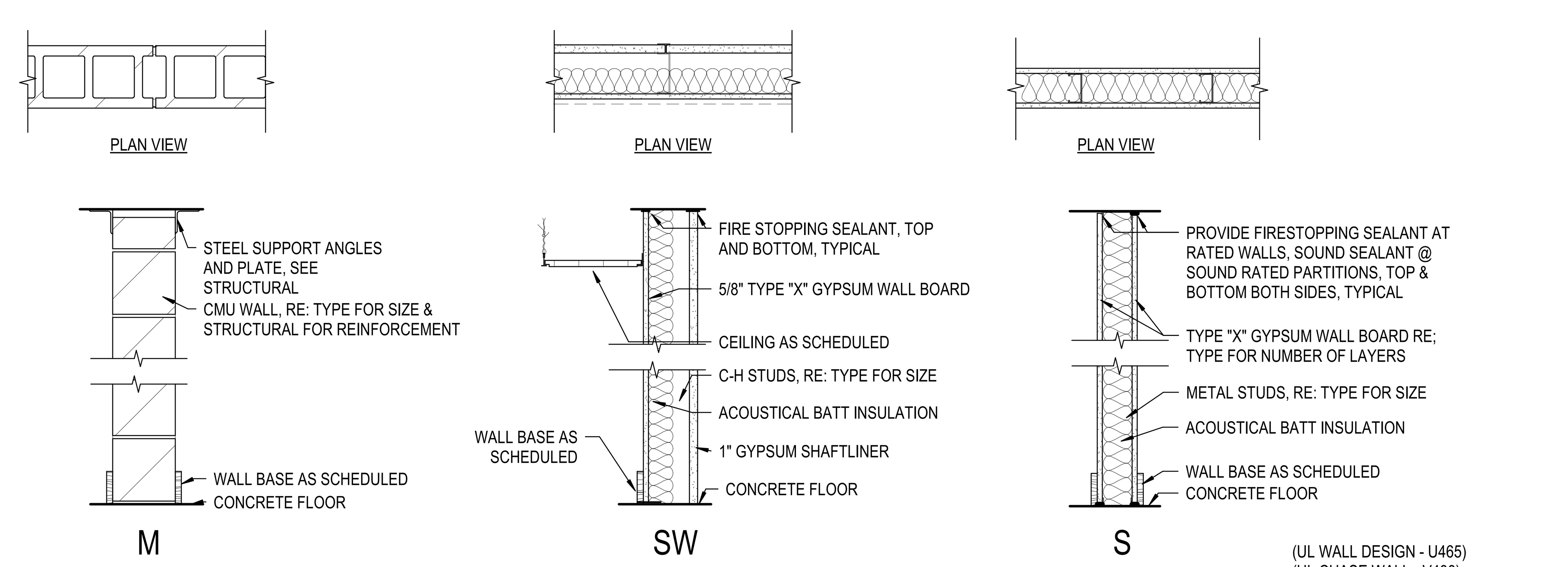


GENERAL NOTES

A. GENERAL NOTES APPLY TO ALL SHEETS.
B. DIMENSIONS ARE ACTUAL AND ARE TO FACE OF STUDS, FACE OF CONCRETE WALLS, FACE OF CMU WALLS, FACE OF FRAMES, OR CENTERLINE OF COLUMNS, UNLESS NOTED OTHERWISE.
C. FINISH FLOOR ELEVATIONS ARE SHOWN THUS:
TYP. FIN. FL. EL.=
D. FLOOR SPOT ELEVATIONS ARE SHOWN THUS:
XXX'-XX"
E. ARCHITECTURAL ELEVATION 100'-0" CORRESPONDS TO CIVIL ELEVATION 6880.0'
F. ALL INTERIOR CMU WALLS SHALL BE 8" NOMINAL THICKNESS, UNLESS NOTED OTHERWISE.
G. WALLS SHADED ON THE FLOOR PLANS INDICATE GROUND FACE MASONRY UNITS (GFCMU). EXTEND GFCMU TO 4 INCHES MINIMUM ABOVE FINISH CEILINGS AND CONTINUE WITH CMU OF SAME THICKNESS.
H. WALL TYPES SHALL BE DESIGNATED ON FLOOR PLANS THUS:
? SEE SHEET 0.1 FOR WALL TYPES. ALL INTERIOR PARTITIONS ARE WALL TYPE "S42" UNLESS NOTED OTHERWISE.
I. ALL MASONRY WALLS AND INTERIOR STUD WALLS SHALL EXTEND TO UNDERSIDE OF FLOOR OR ROOF DECK ABOVE UNLESS NOTED OTHERWISE. SEE REFLECTED CEILING PLAN NOTES.
J. PROVISIONS SHALL BE MADE AT ALL FULL HEIGHT NON-BEARING WALLS FOR 1-INCH VERTICAL MOVEMENT OF THE BUILDING STRUCTURE WITHOUT TRANSFER OF COMPRESSIVE LOADS TO WALL. FILL IRREGULARITIES BETWEEN TOP OF WALL AND DECK ABOVE WITH FIRE SAFING INSULATION OR FIRE STOPPING MATERIALS AS REQUIRED TO MEET FIRE RATING OF RESPECTIVE WALLS. SEE DETAILS ON SHEET CP2.1.
K. SEE SHEET CP1.1 FOR LOCATION OF WALLS OF FIRE-RESISTIVE CONSTRUCTION. ALL WALLS OF FIRE-RESISTIVE CONSTRUCTION SHALL EXTEND TO UNDERSIDE OF FLOOR OR ROOF DECK ABOVE.
L. ALL PENETRATIONS THROUGH WALLS SHALL BE SEALED WITH THRU-WALL FIRE STOPPING MATERIAL AS REQUIRED TO ACHIEVE THE RESPECTIVE FIRE-RESISTIVE RATING AND SMOKE STOPPAGE. SEE SPECIFICATION SECTION 078413.
M. SEE STRUCTURAL DRAWINGS FOR BRACING OF NON-LOAD BEARING MASONRY WALLS.
N. FURNISH AND INSTALL FIRE-TREATED WOOD BLOCKING OR METAL BACKING PLATE IN METAL STUD PARTITIONS FOR THE PROPER ANCHORAGE OF ALL WALL ATTACHED ITEMS; I.E. TOILET ACCESSORIES, CASEWORK, MILLWORK, WALL-MOUNTED FIXTURES, MARKER BOARDS, TACK BOARDS, DOOR STOPS, AUDIO VISUAL BRACKETS, ETC.
O. GYPSUM BOARD AND PLASTER SURFACES SHALL BE ISOLATED WITH CONTROL JOINTS WHERE SHOWN ON DRAWINGS AND AS DESCRIBED IN THE SPECIFICATIONS.
P. MASONRY CONTROL JOINTS (CJ) AND CONTROL JOINTS ABOVE (CJA) SHALL BE LOCATED AS SHOWN ON THE FLOOR PLAN AND BUILDING ELEVATIONS, AND WHERE LARGE PLUMBING VENTS OR RISERS OCCUR IN SINGLE WYTHE MASONRY WALLS, AND WHERE MASONRY WALLS BEARING ON THE CONCRETE FLOOR SLAB ABUT MASONRY WALLS BEARING ON CONCRETE FOOTINGS OR AS INDICATED ON DRAWINGS.
Q. INCLUDE ALL OWNER FURNISHED AND INSTALLED ITEMS AND OWNER FURNISHED AND CONTRACTOR INSTALLED ITEMS IN THE CONSTRUCTION SCHEDULE, AND SHALL COORDINATE WITH THE OWNER TO ACCOMMODATE THESE ITEMS.
R. COORDINATE ALL MECHANICAL CHASE SIZES WITH THE MECHANICAL CONTRACTOR.
S. COORDINATE WITH MECHANICAL AND ELECTRICAL CONTRACTORS THE SIZE AND LOCATION OF EQUIPMENT PADS SHOWN ON PLANS.
T. "MBD" INDICATES MARKER BOARDS ON PLANS. THE LENGTH PRECEDES THE DESIGNATION (EXAMPLE 16' MBD). SEE DETAIL 32/A12.1 FOR MORE INFORMATION.
U. EXTEND FURRING CHANNELS AND GYPSUM BOARD UP 4 INCHES ABOVE FINISHED CEILING ON CMU WALLS.
V. FIRE RATED ENCLOSURES AROUND ALL STEEL COLUMNS SHALL BE CONTINUOUS FROM FLOOR TO UNDERSIDE OF FLOOR OR ROOF DECK ABOVE FOR EACH LEVEL.
W. SCRIBE GYPSUM WALL BOARD OF WALLS AND PARTITIONS TO IRREGULARITIES OF DECK ABOVE. SEAL TIGHTLY AROUND ALL PENETRATIONS.
X. PROVIDE SEISMIC BRACING FOR SUSPENDED CEILINGS OR AS SHOWN ON THE DRAWINGS.
Y. REFERENCE FINISH PLANS FOR TYPICAL GYPSUM DETAIL REVEAL LOCATIONS

WALL TAG LEGEND





CONCRETE MASONRY UNIT PARTITION

WHERE FIRE RATED PROVIDE:
(UL WALL DESIGN U906)

GYPSUM SHAFT WALL PARTITION
(UL WALL DESIGN W419 OR U499)
(UL WALL-TO-DECK DESIGN HW-D-0572)
(COLUMN & BEAM DESIGNS)

GYPSUM WALL BOARD PARTITION

WHERE FIRE RATED PROVIDE:
(COLUMN, BEAM & WALL DESIGNS) → (UL WALL DESIGN - U465) (UL CHASE WALL - V488)
(WALL-TO-DECK DESIGNS) → (UL WALL-TO-DECK DESIGN HW-D-0034) (CHASE HEAD OF WALL WHI 495PSV-1067)

(UL COLUMN FIREPROOFING: X528, X790 CONTRACTOR'S OPTION)
(UL BEAM FIREPROOFING: N501, N743 CONTRACTOR'S OPTION)

1 / 0.1 PARTITION SCHEDULE
SCALE: 1" = 1'-0"

DLR Group

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1650 S. San Francisco Street, Flagstaff Arizona 86011 (SAHPC-73A)

CONSTRUCTION DOCUMENTS
06.22.2020
Revisions

30-19131-00

SYMBOLS, NOTES & ABBREVIATIONS

PLUMBING FIXTURES REQUIRED - BASED ON 2018 INTERNATIONAL PLUMBING CODE SECTION 403 / 2018 INTERNATIONAL BUILDING CODE SECTION 2902

ASSEMBLY AREAS

ASSEMBLY OCCUPANCY (GENERALLY A-3)	OCCUPANT LOAD	WC-MALE	UR-MALE	LAV-MALE	WC-FEMALE	LAV-FEMALE	DRINKING FOUNTAIN	SERVICE SINK	SHOWER EACH GENDER
LEVEL 1: GYM (50SF/OCC)	260								
LEVEL 1: WEIGHT ROOM	201								
LEVEL 1: LOCKERS / THERAPY (h)	157								
LEVEL 1: FUELING STATION	26								
LEVEL 2: LOCKERS / CARDIO / LOUNGES (g)	56	1 per 125	Per IPC 419.2 may replace 67% of required WC with urinals		1 per 65				
LEVEL 3: HALL OF FAME / RECRUITING	94								
LEVEL 3: AUDITORIUM	164								
TOTAL OCCUPANT LOAD	**958**	1 per 75 at Fueling Station		1 per 200	1 per 75 at Fueling Station	1 per 200	1 per 500	1 per Level	
MALE FIXTURES REQUIRED BY FLOOR									
Assembly areas: Level 1	309	2.472	1.656	1.545					
Fueling Station: Level 1	13	0.173	0.116	0.065					
Assembly areas: Level 2	28	0.224	0.150	0.14					
Assembly areas: Level 3	129	1.032	0.691	0.645					
FEMALE FIXTURES REQUIRED BY FLOOR									
Assembly areas: Level 1	309				4.754	1.545			
Fueling Station: Level 1	13				0.173	0.065			
Assembly areas: Level 2	28				0.431	0.140			
Assembly areas: Level 3	129				1.985	0.645			
OTHER FIXTURES									
Assembly areas: Level 1	309						0.618	1	2
Assembly areas: Level 2	56						0.112	1	4
Assembly areas: Level 3	258						0.516	1	0

BUSINESS AREAS

BUSINESS OCCUPANCY GROUP B	OCCUPANT LOAD	WC-MALE	UR-MALE	LAV-MALE	WC-FEMALE	LAV-FEMALE	DRINKING FOUNTAIN	SERVICE SINK	SHOWER EACH GENDER
LEVEL 1: ACADEMICS (b)	21								
LEVEL 2: ATHLETICS & ACADEMICS (b)	148								
TOTAL OCCUPANT LOAD	**169**	1/25 up to 51 plus 1/50 for remainder over 50	Per IPC 419.3 may replace 50% of required WC with urinals	1/40 up to 81 plus 1/80 for remainder over 80	1/25 up to 51 plus 1/50 for remainder over 50	1/40 up to 81 plus 1/80 for remainder over 80	1 per 100	1 per Level	
MALE FIXTURES REQUIRED BY FLOOR									
Business areas: Level 1	11	0.440	0.220	0.275					
Business areas: Level 2	74	2.480	1.240	1.850					
FEMALE FIXTURES REQUIRED BY FLOOR									
Business areas: Level 1	11				0.440	0.275			
Business areas: Level 2	74				2.480	1.850			
OTHER FIXTURES									
Business areas: Level 1	21						0.21	1	
Business areas: Level 2	148						1.48	1	

COMBINED OCCUPANCY AREAS

		WC-MALE	UR-MALE	LAV-MALE	WC-FEMALE	LAV-FEMALE	DRINKING FOUNTAIN	SERVICE SINK	SHOWER EACH GENDER
TOTAL REQUIRED MALE FIXTURES		**3**	**4**	**5**					
TOTAL PROVIDED MALE FIXTURES (g)		**4**	**4**	**7**					
Fractional Required: Level 1 (f)		3.085	1.992	1.885					
Provided: On Level 1 (c)		1	1	2					
Provided: Above Level 1 (c,d)		0	0	1					
Provided Total Available for Level 1 (c,d)		1	1	3					
Fractional Required: Level 2 (f)		2.704	1.390	1.99					
Provided: On Level 2 (c,g)		1	1	2					
Provided: Above Level 2 (c,d)		1	0	1					
Provided Total Available for Level 2 (c,d)		2	1	3					
Provided: for Basketball Locker Room (g)		2	1	3					
Fractional Required: Level 3 (f)		1.032	0.691	0.645					
Provided: Level 3 (c,f)		1	2	1					
TOTAL REQUIRED FEMALE FIXTURES					**11**	**5**			
TOTAL PROVIDED FEMALE FIXTURES (g)					**12**	**10**			
Fractional Required: Level 1 (f)					5.367	1.885			
Provided: On Level 1 (c)					5	5			
Provided: Above Level 1 (c,d)					0	0			
Provided Total Available for Level 1 (c,d)					5	5			
Fractional Required: Level 2 (f)					2.911	1.99			
Provided: On Level 2 (c,g)					2	2			
Provided: Above Level 2 (c,d)					3	2			
Provided Total Available for Level 2 (c,d)					5	4			
Provided: for Basketball Locker Room (g)					3	3			
Fractional Required: Level 3 (f)					1.985	0.645			
Provided: Level 3 (c,f)					2	1			
OTHER REQUIRED FIXTURES							**4**	**4**	**0**
OTHER PROVIDED FIXTURES							**6**	**4**	**6**
Fractional Required: Level 1							0.828	2	2
Provided: On Level 1 (a)							3	2	
Fractional Required: Level 2							1.592	1	4
Provided: On Level 2							2	1	
Fractional Required: Level 3							0.112	1	0
Provided: On Level 3							1	1	0

NOTES:

a. In addition, 1 Handwash sink & 1 3-bay sanitizing sink are provided at Food Prep. 1 Countertop sink is provided at Fueling Station.
b. Business area Plumbing Occupant Load is calculated based on Table 1004.5 Occupant Load Factors (Generally 150GSF/Occ). For egress, this occupant load also includes additional reasonable seat counts.
c. Fixtures located within family or assisted-use toilet rooms required by Section 1109.2.1 are permitted to be included in the number of required either male or female fixtures.
d. Per 2902.3.4 Plumbing facilities shall be located not more than one story above or below area served and within a maximum travel distance of 300 ft.
e. Service sinks shall not be required in business occupancies with an occupant load of 15 or fewer
f. Per 2902.1.1 The total occupant load is divided in half to determine the occupant load of each sex. The required number of fixtures, the fixture ratio or ratios for each fixture type shall be applied to the occupant load of each sex in accordance with Table 2902.1. Fractional numbers resulting from applying the fixture ratios of Table 2902.1 shall be rounded up to the next whole number. For multiple occupancies, such fractional numbers for each occupancy shall first be summed and then rounded up to the next whole number.
g. 17 Occupants & plumbing fixtures in each Basketball Locker Room are listed separately & excluded from Occupancy & Total Fixtures Provided Counts
h. 5 Occupants included from Mechanical space below Hydrotherapy

GENERAL PROJECT INFORMATION:

NAME OF PROJECT:	STUDENT ATHLETE HIGH PERFORMANCE CENTER
LOCATION:	FLAGSTAFF, AZ, 86001
PROPOSED USE:	MIXED USE OCCUPANCY
OWNER:	NORTHERN ARIZONA UNIVERSITY C/O JOSHUA SPEAR, FACILITY SERVICES PO BOX 5637 FLAGSTAFF, ARIZONA 86011 PHONE NUMBER
ARCHITECT:	DLR GROUP STANLEY AXTHELM, 24627 6225 N 24th ST, SUITE 250 PHOENIX, AZ 85016 602-381-8580

APPLICABLE BUILDING CODES:

NORTHERN ARIZONA UNIVERSITY - FLAGSTAFF, ARIZONA
2018 INTERNATIONAL BUILDING CODE (IBC)
2018 INTERNATIONAL FIRE CODE (IFC) AS AMENDED BY NAU FIRE MARSHAL
2018 INTERNATIONAL MECHANICAL CODE (IMC)
2018 INTERNATIONAL FUEL GAS CODE (IFGC)
2018 INTERNATIONAL PLUMBING CODE (IPC)
2017 NATIONAL ELECTRICAL CODE (NEC)
2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
2010 ADA STANDARDS FOR ACCESSIBLE DESIGN
INTERNATIONAL CODE COUNCIL (ICC) A117.1-2009 ACCESSIBLE & USABLE BUIDINGS & FACILITIES
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NORTHERN ARIZONA UNIVERSITY FIRE MARSHAL
NORTHERN ARIZONA UNIVERSITY DESIGN GUIDELINES & TECHNICAL STANDARDS
INCLUDING THE FOLLOWING APPLICABLE REGULATIONS:
ICC - INTERNATIONAL WILDLAND-URBAN INTERFACE CODE
NFPA 10 - PORTABLE FIRE EXTINGUISHERS - 2018
NFPA 13 - INSTALLATION OF SPRINKLER SYSTEMS - 2016
NFPA 14 - STANDPIPE AND HOSE SYSTEMS - 2016
NFPA 72 - NATIONAL FIRE ALARM CODE - 2016
NFPA 80 - FIRE DOORS AND WINDOWS - 2016

OCCUPANCY GROUPS INCLUDED IN PROJECT

OCCUPANCY GROUPS:	IBC 304
AUDITORIUM, HALL OF FAME, WEIGHT ROOM & CARDIO ROOM & GYMNASIUM	ASSEMBLY GROUP A-3
OFFICES & INSTRUCTION AREAS	BUSINESS GROUP B

FIRE AND SMOKE PROTECTION SYSTEMS:

AUTOMATIC SPRINKLER SYSTEM PER IBC SECTION 903 & NFPA 13
STANDPIPE SYSTEMS PER IBC SECTION 905 & NFPA 14
PORTABLE FIRE EXTINGUISHERS PER IBC SECTION 906 & NFPA 10
FIRE ALARM SYSTEM PER IBC SECTION 907 & NFPA 72
SMOKE DETECTION SYSTEM PER IBC SECTION 907
EMERGENCY VOICE/ALARM COMMUNICATION SYSTEM PER IBC SECTION 907 & NFPA 72
EMERGENCY ALARM SYSTEMS PER IBC SECTION 908 & NFPA 72
FIRE DEPARTMENT CONNECTIONS PER IBC SECTION 912
FIRE PUMPS PER IBC SECTION 913
EMERGENCY RESPONDER SAFETY FEATURES PER IBC SECTION 914
EMERGENCY RESPONDER RADIO COVERAGE PER IBC SECTION 915 & IFC SECTION 510
*FLOOR OPENINGS AT UNENCLOSED STAIR PROTECTED PER 1019.3.4 IN LIEU OF ATRIUM SMOKE CONTROL
ATRIUM INTERIOR WALL AND CEILING FINISHES TO BE NOT LESS THAN CLASS B PER IBC 404.9
* (PER 1/17/20 PHONE CONVERSATION BETWEEN GREG MACE & STAN AXTHELM)

BUILDING CONSTRUCTION TYPE AND DESIGN REQUIREMENTS

CONSTRUCTION TYPE:	II-B (IBC)
RISK CATEGORY	III
SEISMIC DESIGN:	SITE CLASS C (SEISMIC DESIGN CATEGORY B)

BUILDING ENVELOPE REQUIREMENTS: PER IECC SECTION C402.1.3

CLIMATE ZONE: 5B (FLAGSTAFF, AZ) PER IECC SECTION 301.

OPAQUE THERMAL ENVELOPE ASSEMBLY REQUIREMENTS - IECC TABLE C402.1.3 - R-VALUE

ENVELOPE ASSEMBLY	CLIMATE ZONE - 5B - MINIMUM R-VALUES		
	IECC Table C402.1.3 (For Reference Only)	ASHRAE 90.1 Table 5.5-5 (For Reference Only)	NAU Design Guidelines 6.2.12 (Project Requirement)
ROOF - Insulation entirely above deck	R-30ci	R-30ci	R-39ci
ROOF - Metal Buildings (with R-5 Thermal Blocks) *a, *b	R-19 + R-11 LS	R-19+R-11LS or R-25+R-8LS	R-24.7+R-14.3LS or R-32.5+R-10.4LS
ROOF - Attic and other	R-38	R-49	R-63.7
WALLS ABOVE GRADE - Mass	R-11.4ci	R-11.4ci	R-14.82ci
WALLS ABOVE GRADE - Metal Building *b	R-13 + R-13ci	R-0 + R-19ci	R-0 + R-24.7ci
WALLS ABOVE GRADE - Metal Framed	R-13 + R-7.5ci	R-13 + R-10ci	R-16.9 + R-13ci
WALLS ABOVE GRADE - Wood Framed and Other	R-13 + R-3.8ci or R-20	R-13+R-7.5ci or R-19+R-5ci	R-21.97 + R-12.675ci or R-24.7+R-6.5ci
WALLS BELOW GRADE *d	R-7.5ci	R-7.5ci	R-9.75ci
FLOORS - Mass	R-10ci	R-14.6ci	R-18.98ci
FLOORS - Joist/framing	R-30	R-30	R-39
SLAB-ON-GRADE FLOORS - Unheated Slabs	R-10 for 24" below	R-15 for 24" below	R-19.5 for 24" below
SLAB-ON-GRADE FLOORS - Heated Slabs *h	R-15 for 36" below + R-5	R-20 for 48"	R-26 for 36" below + R-7.8
OPAQUE DOORS - Swinging	U-0.37 Maximum	U-0.37 Maximum	U-0.217 Maximum
OPAQUE DOORS - Roll-up or sliding	R-4.75	U-0.31 Maximum	U-0.259 Maximum

ci = Continuous insulation. NR = No Requirement, LS = Liner System.
*a Assembly descriptions can be found in ANSI/ASHREA/IESNA Appendix A
*b When using R-Value compliance method, a thermal spacer block is required, otherwise use U-Factor compliance method.
*c R-5.7ci is allowed to be substituted with concrete block walls complying with ASTM C 90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 BTU-in/h-f2 F.
*d When heated slabs are placed below grade, walls must meet the exterior insulation requirements for perimeter insulation according to the heated slab-on-grade construction.
*e Mass floors shall be in accordance with Section C402.2.3
*f Steel floor joist systems shall be R-38.
*g Mass walls shall be in accordance with Section C402.2.2
*h The first value is for perimeter insulation and the second value is for slab insulation. Perimeter insulation is not required below the slab. Not applicable to garage doors. See Table C402.1.4

OPAQUE THERMAL ENVELOPE ASSEMBLY REQUIREMENTS - IECC TABLE C402.1.4 - U-FACTOR

ENVELOPE ASSEMBLY	CLIMATE ZONE - 5B - MAXIMUM U-FACTOR		
	IECC Table C402.1.4 (For Reference Only)	ASHRAE 90.1 Table 5.5-5 (For Reference Only)	NAU Design Guidelines 6.2.12 (Project Requirement)
ROOF - Insulation entirely above deck	U-0.032	U-0.032	U-0.0224
ROOF - Metal Buildings	U-0.035	U-0.037	U-0.0259
ROOF - Attic and other	U-0.027	U-0.021	U-0.0147
WALLS ABOVE GRADE - Mass	U-0.90	U-0.90	U-0.63
WALLS ABOVE GRADE - Metal Building	U-0.052	U-0.052	U-0.0364
WALLS ABOVE GRADE - Metal Framed	U-0.064	U-0.064	U-0.0448
WALLS ABOVE GRADE - Wood Framed and Other	U-0.064	U-0.064	U-0.0448
WALLS BELOW GRADE *a	C-0.119	C-0.119	70%<C-0.119
FLOORS - Mass	U-0.074	U-0.057	U-0.0399
FLOORS - Joist/framing	U-0.033	U-0.038	U-0.0266
SLAB-ON-GRADE FLOORS - Unheated Slabs	F-0.54	F-0.52	70%<F-0.52
SLAB-ON-GRADE FLOORS - Heated Slabs	F0.79 + 0.64 full slab	F0.688	70%<F0.688

*a When heated slabs are placed below grade, walls must meet the F-factor requirements for perimeter insulation according to the heated slab-on-grade construction.

FENESTRATION ASSEMBLY REQUIREMENTS - IECC TABLE C402.4

	CLIMATE ZONE - 5B - MAXIMUM U-FACTOR		
Vertical Fenestration (40% max. of above grade wall)	IECC Table C402.4 (For Reference Only)	ASHRAE 90.1 Table 5.5-5 (For Reference Only)	NAU Design Guidelines 6.2.12 (Project Requirement)
Framing materials other than metal with or without metal reinforcement or cladding	0.35 U-Factor Maximum	0.31 U-Factor Maximum	0.217 U-Factor Maximum
Metal framing with or without thermal break			
Curtain Wall / Storefront	0.45 U-Factor Maximum	0.38 U-Factor Maximum	0.266 U-Factor Maximum
Entrance Doors	0.80 U-Factor Maximum	0.68 U-Factor Maximum	0.476 U-Factor Maximum
All other fenestration *a	0.55 U-Factor Maximum	0.46 U-Factor Maximum	0.32 U-Factor Maximum
SHGC - ALL FRAME TYPES		0.38 SHGC Maximum	0.266 U-Factor Maximum
SHGC: PF < 0.25	0.40 SHGC Maximum		
SHGC: 0.25 < PF < 0.5	No requirement		
SHGC: PF > 0.5	No requirement		
VTI/SHGC			
SKYLIGHTS (3% maximum of roof area)	0.60 U-Factor Maximum 0.40 SHGC Maximum	0.50 U-Factor Maximum 0.40 SHGC Maximum	0.35 U-Factor Maximum 130%<0.40 SHGC Maximum

*a All others includes operable windows, fixed windows and nonentrance doors.
PF = Projection Factor (PF = A / B)
A Distance measured horizontally from the furthest continuous extremity of any overhang, eave, or permanently attached shading device to the vertical surface of the glazing.
B Distance measured vertically from the bottom of the glazing to the underside of the overhang, eave or permanently attached shading device.

BUILDING HEIGHT, NUMBER OF STORIES AND BUILDING AREA LIMITATIONS PER IBC CHAPTER 5

BUILDING SAHPC: MIXED-OCCUPANCY, MULTISTORY BUILDING - SEPARATED OCCUPANCIES			
OCCUPANCY TYPE	B	A-3	
PROPOSED TYPE OF CONSTRUCTION	II-B	II-B	
ALLOWABLE BUILDING HEIGHT ABOVE GRADE PLANE - PER IBC TABLE 504.3			
S - AUTOMATIC SPRINKLER SYSTEM	75	75	
PROPOSED MAXIMUM HEIGHT (FEET)	68		
ALLOWABLE NUMBER OF STORIES ABOVE GRADE PLANE - PER IBC TABLE 504.4			
S - AUTOMATIC SPRINKLER SYSTEM	4	3	
MOST RESTRICTIVE ALLOWABLE NUMBER OF STORIES	3		
PROPOSED NUMBER OF STORIES ABOVE GRADE PLANE	2		
ALLOWABLE AREA CALCULATION PER IBC SECTION 506.2.4 EQUATION 5-3 Aa = At + (NS x If)			
ALLOWABLE AREA FACTOR (At) TABLE 506.2 SM IN SQUARE FEET	SM	SM	
NS - NON SPRINKLERED	23,000	9,500	
SM - AUTOMATIC SPRINKLER SYSTEM - MULTISTORY ABOVE GRADE	69,000	28,500	
IBC 506.3 - FRONTAGE INCREASE (If) [NOT USED]	0.61	0.61	
ALLOWABLE AREA PER OCCUPANCY TYPE (Aa) IN SQUARE FEET	83,030	34,295	
ALLOWABLE AREA PER STORY (As) CALCULATIONS			**TOTALS**
LEVEL 1- BUILDING 1: PROPOSED BUILDING AREA PER OCCUPANCY	13,188	26,785	39,973
LEVEL 1- BUILDING 1: RATIO OF PROPOSED BLDG AREA / ALLOWABLE AREA	0.16	0.78	0.94
LEVEL 2 PROPOSED BUILDING AREA PER OCCUPANCY	14,222	0	14,222
LEVEL 2 RATIO OF PROPOSED BLDG AREA / ALLOWABLE AREA	0.17	0.00	0.17
LEVEL 3 PROPOSED BUILDING AREA PER OCCUPANCY	2,759	6,070	8,829
LEVEL 3 RATIO OF PROPOSED BLDG AREA / ALLOWABLE AREA	0.03	0.18	0.21
SUM OF RATIOS OF PROPOSED BLDG AREA / ALLOWABLE AREA PER LEVEL			1.32
BUILDING PROPOSED TOTAL BUILDING AREA (SQUARE FEET)			**63,024**

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BUILDING AREA MODIFICATION - FRONTAGE INCREASE PER IBC SECTION 506.2

Frontage increase equation: If = [F / P - 0.25] W / 30

FRONTAGE CALCULATION FOR BUILDING		
If =	**0.61**	Area increase due to frontage
F =	925	Building perimeter (feet) that fronts on a public way or open spacing having 20 feet open minimum width
P =	1,040	Perimeter of entire building (feet)
W =	28.832	Weighted Width of public way or open space (feet) in accordance with equation 5-3.

Weighted Width			(W) =	28.832	L#	Length of associated portion of exterior perimeter wall
L#		W#		L# x W#	W#	Width of open space associated with L# portion of exterior perimeter wall
L1	333.25	W1	30.00	9997.5		
L2	78.00	W2	30.00	2340		
L3	42.75	W3	20.00	855		
L4	14.17	W4	30.00	425.1		Mechanical Yard limits width of Open Space
L5	20.00	W5	30.00	600		
L6	39.33	W6	14.17	0		Mechanical Yard limits width of Open Space
L7	29.00	W7	25.67	744.43		Fence on property limits width of Open Space
L8	15.00	W8	14.17	0		Fence on property limits width of Open Space
L9	124.25	W9	30.00	3727.5		
L10	98.08	W10	30.00	2942.4		
L11	62.08	W11	30.00	1862.4		
L12	19.00	W12	0.00	0		Pedestrian Bridge limits width of Open Space
L13	61.25	W13	0.00	0		Pedestrian Bridge limits width of Open Space
L14	2.67	W14	25.00	66.75		
L15	26.08	W15	30.00	782.4		
L16	78.00	W16	30.00	2340		

FIRE-RESISTANCE RATINGS FOR BUILDING ELEMENTS (IBC TABLE 601 & SECTION 707.5.1)

FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS (HOURS) **TABLE 601**

BUILDING ELEMENT	TYPE II-B
Primary structural frame (see IBC Section 202 & per Table 704.10)	0
Supporting more than one floor, columns or other bearing walls	
Supporting one floor only	
Supporting a roof only	
Bearing Walls - Exterior (& per Tables 602 & 704.10)	0
Supporting more than one floor, columns or other bearing walls	
Supporting one floor only	
Supporting a roof only	
Bearing Walls - Interior	0
Supporting more than one floor, columns or other bearing walls	
Supporting one floor only	
Supporting a roof only	
Nonbearing walls and partitions - Exterior (& per Table 602)	0
Nonbearing walls and partitions - Interior (unless otherwise required)	0
Floor Construction and associated secondary members (see IBC Section 202)	0
Roof Construction and associated secondary members (see IBC Section 202)	0

FIRE-RESISTANCE RATING REQUIREMENTS SUPPORTING FIRE BARRIERS

Per 707.5.1 Except separations required for incidental uses, (Table 509) or as otherwise required by IBC, construction supporting fire barriers shall be protected with at least the fire-resistance rating of the fire barrier supported. Hollow vertical spaces within a fire barrier shall be fireblocked in accordance with Section 718.2 at every floor level.

MEANS OF EGRESS - OCCUPANT LOAD FACTORS FOR ROOMS AND SPACES

MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT	OCCUPANT LOAD FACTOR
FUNCTION OF SPACE	(SF / Occupant) IBC TABLE 1004.5
Accessory storage areas, mechanical equipment room	300 gross
Storage Use (other than mercantile rooms)	
Assembly	
Exhibit Gallery and Museum	30 net
Waiting spaces	
Assembly without fixed seats	
Concentrated (chairs only - not fixed)	7 net
Unconcentrated (tables and chairs)	15 net
Standing space	5 net
Assembly with fixed seats	Per 1004.4
Business areas	150 gross
Concentrated business use areas	Per 1004.8
Educational	
Classroom area	20 net
Shops and other vocational rooms areas	50 net
Exercise rooms with (or without)** equipment	50 gross
Locker rooms**	50 gross
Kitchens, commercial	200 gross
Parking garages	200 gross

*Where fixed (or movable) seating is provided the Occupant Load shall be the greater of the number of seats or as determined by Occupant Load Factors.

**Occupancy not less than number of lockers

MEANS OF EGRESS - EGRESS SIZING

COMPONENT	CAPACITY FACTOR*
	IBC 1005.3.1, 1005.3.2 & 1029.6.1
STAIRS	0.2 INCH PER OCCUPANT
OTHER	0.15 INCH PER OCCUPANT
ASSEMBLY AISLES	0.375 INCH PER OCCUPANT

*Notes:
Classroom, auditorium & computer lab egress corridors shall be size for double loads per NAU Design Guidelines 12.3.4.2
IBC Sizing requirements apply per IBC 102.4.1 (confirmed by 1/10/2020 email correspondence from Greg Mace)
IBC width based on Exception 1 for Automatic Sprinkler System with emergency voice alarm.
Stairway egress capacity width is to be measured at handrail height between face of wall or face of guardrail that handrail is attached to.
Ramp egress capacity width is to be measured between handrails. Clear width between handrails to be minimum 36 inches.
Projections into the required width of stairways and ramps at each side shall not exceed 4 1/2 inches at or below the handrail height.
Projections into the required width shall not be limited above the minimum headroom height required.
Projections due to intermediate handrails shall not constitute a reduction in the egress width.

MEANS OF EGRESS - COMMON PATH OF TRAVEL (WITH SPRINKLER SYSTEM)

COMMON PATH OF EGRESS TRAVEL		DEAD END CORRIDOR LIMIT
OCCUPANCY TYPE	IBC TABLE 1006.2.1	IBC 1020.4
A (Over 49 Occupants)	75	20
A (Up to 49 Occupants)	75	20
B, M & S	100	50
A (With seating)	30 (per IBC 1029.8)	

MEANS OF EGRESS - TRAVEL DISTANCE TO EXIT

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EXIT ACCESS TRAVEL DISTANCE WITH SPRINKLER SYSTEM (FEET)

OCCUPANCY TYPE	IBC TABLE 1017.2
A & S1	250*
B	300*

Where required exit access is not through atrium, (or is through atrium at level of exit discharge) exit access is per 1017
*Path of egress travel through atrium not at level of exit discharge is limited to 200 ft within the atrium per IBC 404.9.3
Floor openings at unenclosed stair protected per 1019.3.4 in lieu of Atrium with Smoke Control (per 1/17/20 phone conversation between Greg Mace & Stan Axthelm)
1029.8 The common path of egress travel shall (at aisles) not exceed 30 feet from any seat to a point where an occupant has a choice of two paths of egress travel to two exits.

MEANS OF EGRESS - MINIMUM CORRIDOR WIDTH

IBC TABLE 1018.2 MINIMUM CORRIDOR WIDTH

OCCUPANCY	WIDTH (minimum)
Any facilities not listed below	44 inches
Access to and utilization of mechanical, plumbing or electrical systems or equipment	24 inches
With a required occupancy capacity less than 50	36 inches
In Group E with a corridor having a required capacity of 100 or more	72 inches

REQUIRED SEPARATIONS - CORRIDORS

CORRIDOR FIRE RESISTANCE RATING (with Sprinkler System)

OCCUPANCY	IBC TABLE 1020.1
ASSEMBLY	0
EDUCATIONAL	0
BUSINESS	0
STORAGE	0

1019.3 Shaft enclosure of floor openings with exit access stairways except as permitted per 1019.3.4

REQUIRED SEPARATIONS - EXIT COMPONENTS

INTERIOR EXIT STAIRWAYS / EXIT DISCHARGE (PER IBC 404.10)

A Not greater than 50 percent of interior exit stairways are permitted to egress through an atrium on the level of exit discharge in accordance with IBC section 1028

EXIT ACCESS STAIRWAYS AND RAMPS (PER IBC 1019)

A Shaft enclosire not required per 1019.3.4 where: Exit access stairways and ramps in buildings equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1, where the area of the vertical opening between stories does not exceed twice the horizontal projected area of the stairway or ramp and the opening is protected by a draft curtain and closely spaced sprinklers in accordance with NFPA 13.

INTERIOR EXIT STAIRWAYS AND RAMPS (PER IBC SECTION 1023)

A Exit stairway enclosures shall be fire barriers per IBC Section 707 and/or horizontal assemblies per IBC Section 711.
Stairway enclosure fire-resistance rating shall be:
  1 Not less than the fire-resistance rating of the floor assembly penetrated, but need not exceed 2 hours.
  2 Not less than 2 hours where connecting 4 stories or more.
  3 Not less than 1 hour where connecting less than 4 stories.
Number of stories connected by the stairway enclosure shall include any basements.
B Interior exit stairways and ramps serving as and exit component in means of egress shall lead directly to the exterior of the building or shall be extended to the exterior with an exit passageway, except as permitted in IBC Section 1027.1.
IBC Section 1027.1 Exceptions1 and 2 shall not exceed 50 percent of the number and capacity of the required exits.
  1 Maximum of 50 percent of the number and capacity of interior exit stairways and ramps is permitted to egress through areas on the level of exit discharge provided all of the following are met:
  1.1 Such enclosures egress to a free and unobstructed path of travel to and exterior exit door and such exit is readily visible and identifiable from the point of termination of the enclosure.
  1.2 The entire area of the level of exit discharge is separate from areas below by construction conforming to the fire-resistance rating for the enclosure.
  1.3 The egress path from the interior exit stairway and ramp on the level of exit discharge is protected throughout by an approved automatic sprinkler system.
  2 A maximum of 50 percent of the number and capacity of the interior exit stairways and ramps is permitted to egress through a vestibule provided all of the following are met:
  2.1 The entire area of the vestibule is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.
  2.2 The depth from the exterior of the building is not greater than 10 feet and the length is not greater than 30 feet.
  2.3 The area is separated from the remainder of the level of exit discharge by construction providing protection at least the equivalent of approved wired glass in steel frames.
  2.4 The area is used only for means of egress and exits directly to the outside.
  3 Horizontal exits complying with IBC Section 1025 shall not be required to discharge directly to the exterior of the building.
C Enclosures under interior stairways:
  1 The walls and soffits within enclosed usable spaces under enclosed and unenclosed stairways shall be protected by 1-hour fire-resistance rated construction or the fire-resistance rating of the stairway enclosure, whichever is greater.
  2 Access to the enclosed space under the stairway shall not be directly from within the stair enclosure.
  Exception: Spaces under stairways serving and contained within a single residential dwelling unit in Group R-2 shall be permitted to be protected on the enclosed side with 1/2-inch gypsum board.

EXIT PASSAGEWAYS (PER IBC SECTION 1023)

A Exit passageways shall be fire barriers per IBC Section 707 and/or horizontal assemblies per IBC Section 711.
Exit passageway enclosures shall have walls, floors and ceilings not less than 1-hour fire-resistance rating, and not less than that required for any connecting interior exit stairway or ramp.

REQUIRED SEPARATIONS - SHAFT ENCLOSURES

SHAFT ENCLOSURES (PER IBC SECTION 713)

A Shafts required to protect openings and penetrations through floor/ceiling and roof/ceiling assemblies.
Shaft enclosures shall be fire barriers per IBC Section 707 and/or horizontal assemblies per IBC Section 711.
Shaft enclosure fire-resistance rating shall be:
  1 Not less than the fire-resistance rating of the floor assembly penetrated, but need not exceed 2 hours.
  2 Not less than 2 hours where connecting 4 stories or more.
  3 Not less than 1 hour where connecting less than 4 stories.
Number of stories connected by the shaft enclosure shall include any basements.

MISCELLANEOUS REQUIRED SEPARATIONS

A Enclosure of Atriums per IBC Section 404.6*
  1 Atrium spaces shall be separated from adjacent spaces by a 1-hour fire barrier constructed in accordance with IBC Section 707 and/or horizontal assemblies per IBC Section 711.
  2 Exception 4. A fire barrier is not required between the atrium and adjoining spaces where the atrium is not required to be provided with a smoke control system.*
B 1019.3 Protection of Floor Openings with Exit Access Stairways*
  1 Shaft enclosure is required of floor openings with exit access stairways except as permitted per 1019.3.4
  Floor opening limited to twice the horizontal area of stairway
  Floor opening protected by closely spaced sprinklers and draft curtain in compliance with NFPA 13
C Draft Curtain: NFPA 13 / NFPA 204: A3.3.9
  1 A draft curtain can be a solid fixed obstruction such as a beam, girder, soffit, or similar material.
  Alternately, a deployable barrier can be used that descends to a fixed depth during its operation.
* Provide draft curtain & closely spaced sprinklers per IBC 1019.3 item 4 in lieu of smoke control system (per 1/17/20 phone conversation Greg Mace, Associate Director, Engineering and Inspections, Jeff Young NAU Fire Marshall and Stan Axthelm).

FIRE-RESISTANCE RATINGS - MARKINGS AND IDENTIFICATION (IBC SECTION 703.7)

Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:

1 Be located in accessible concealed floor, floor-ceiling or attic spaces.
2 Be located within 15 feet of the end of each wall and at intervals not exceeding 30 feet measured horizontally along the wall.
3 Include lettering not less than 3 inches in height with a minimum 3/8 inch stroke in a contrasting color incorporating the suggested wording.

CODE PLAN DESIGNATION	PAINTED LABEL
SB	SMOKE BARRIER
SP	SMOKE PARTITION
1/2-C	1/2 - HOUR CORRIDOR FIRE BARRIER
1-C	1 - HOUR CORRIDOR FIRE BARRIER
1-EW	1 - HOUR EXTERIOR WALL
2-EW	2 - HOUR EXTERIOR WALL
1-FB	1 - HOUR FIRE BARRIER
1-FP	1 - HOUR FIRE PARTITION
1-FSB	1 - HOUR FIRE AND SMOKE BARRIER
1-FW	1 - HOUR FIRE WALL
2-FW	2 - HOUR FIRE WALL
3-FW	3 - HOUR FIRE WALL
1-HX	1 - HOUR HORIZONTAL EXIT FIRE BARRIER
1-VS	1 - HOUR VERTICAL SHAFT FIRE BARRIER
1-VX	1 - HOUR VERTICAL EXIT STAIR FIRE BARRIER
1-XP	1 - HOUR EXIT PASSAGEWAY FIRE BARRIER

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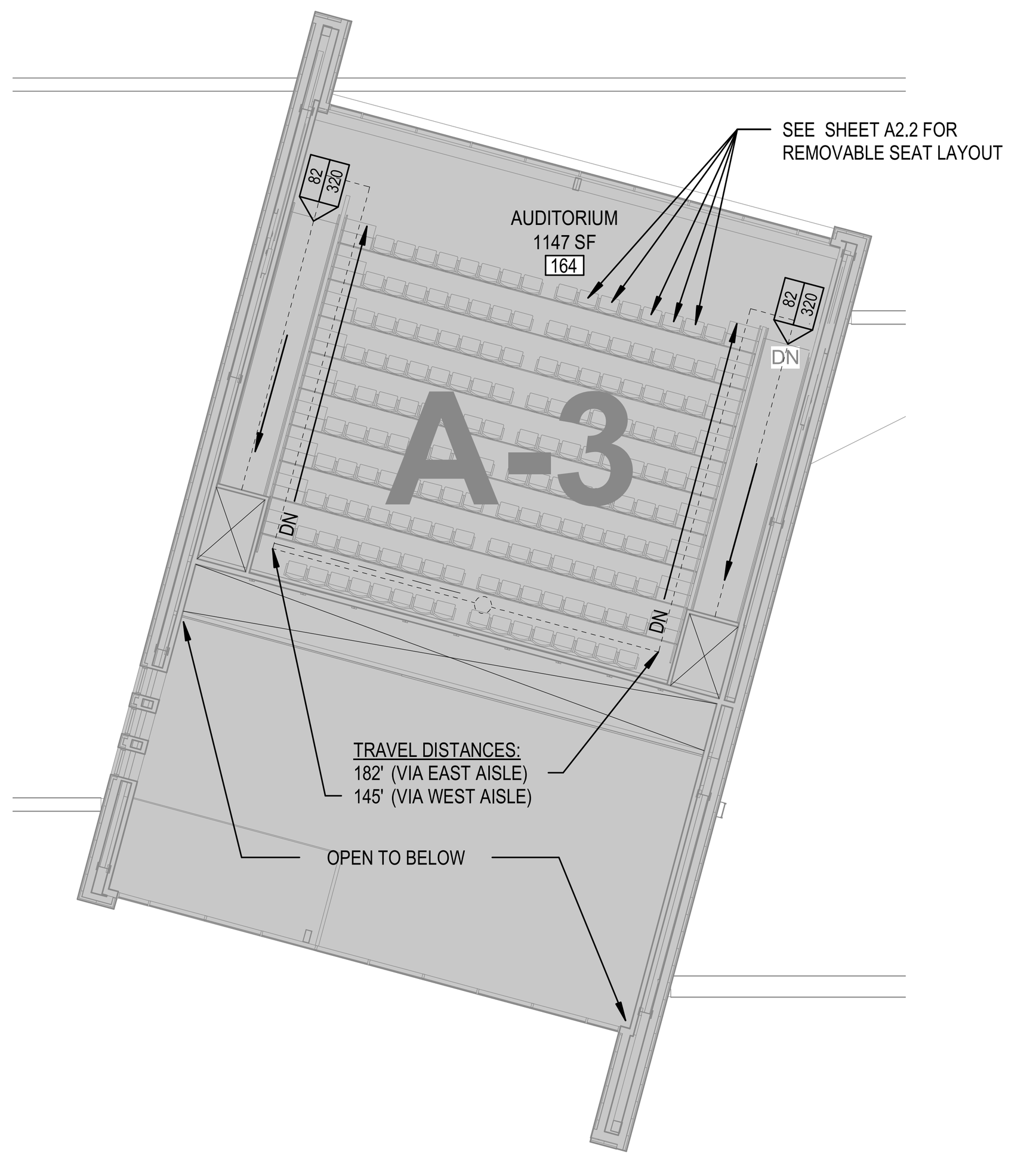
CONSTRUCTION DOCUMENTS
06.22.2020
Revisions
ASI03 09.04.20 TRADES, AHJ REVS

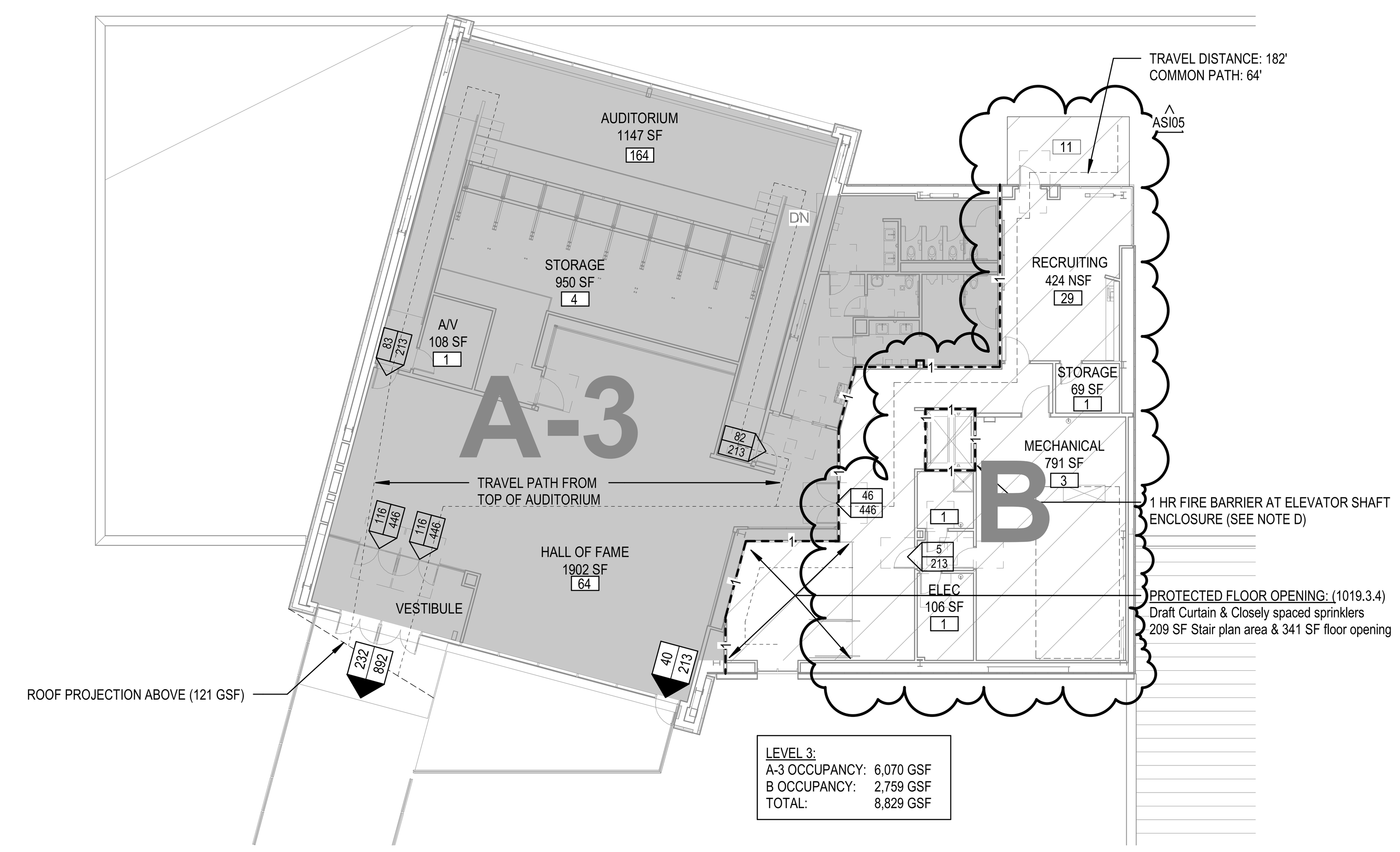
30-19131-00

CODE SUMMARY

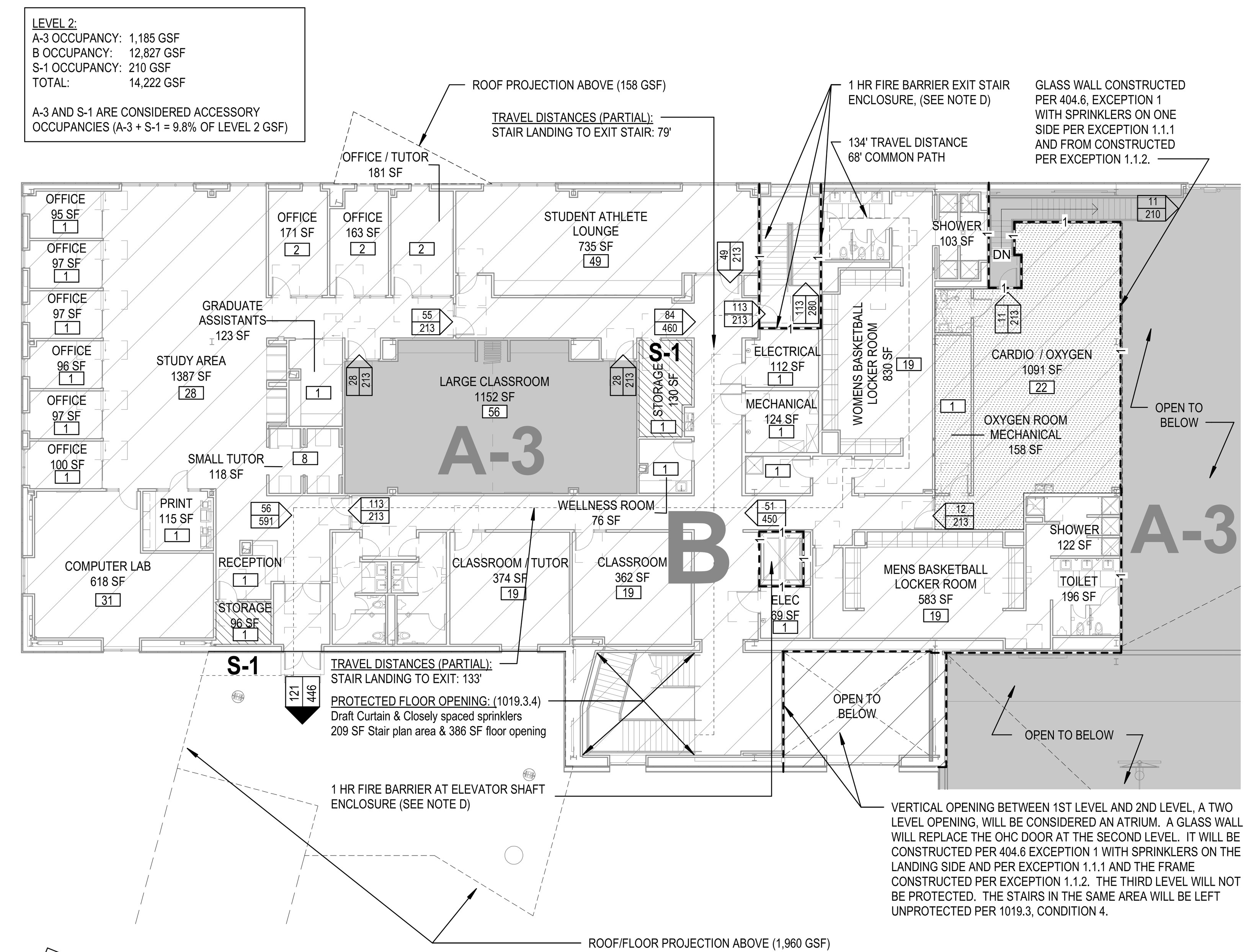
CP0.0



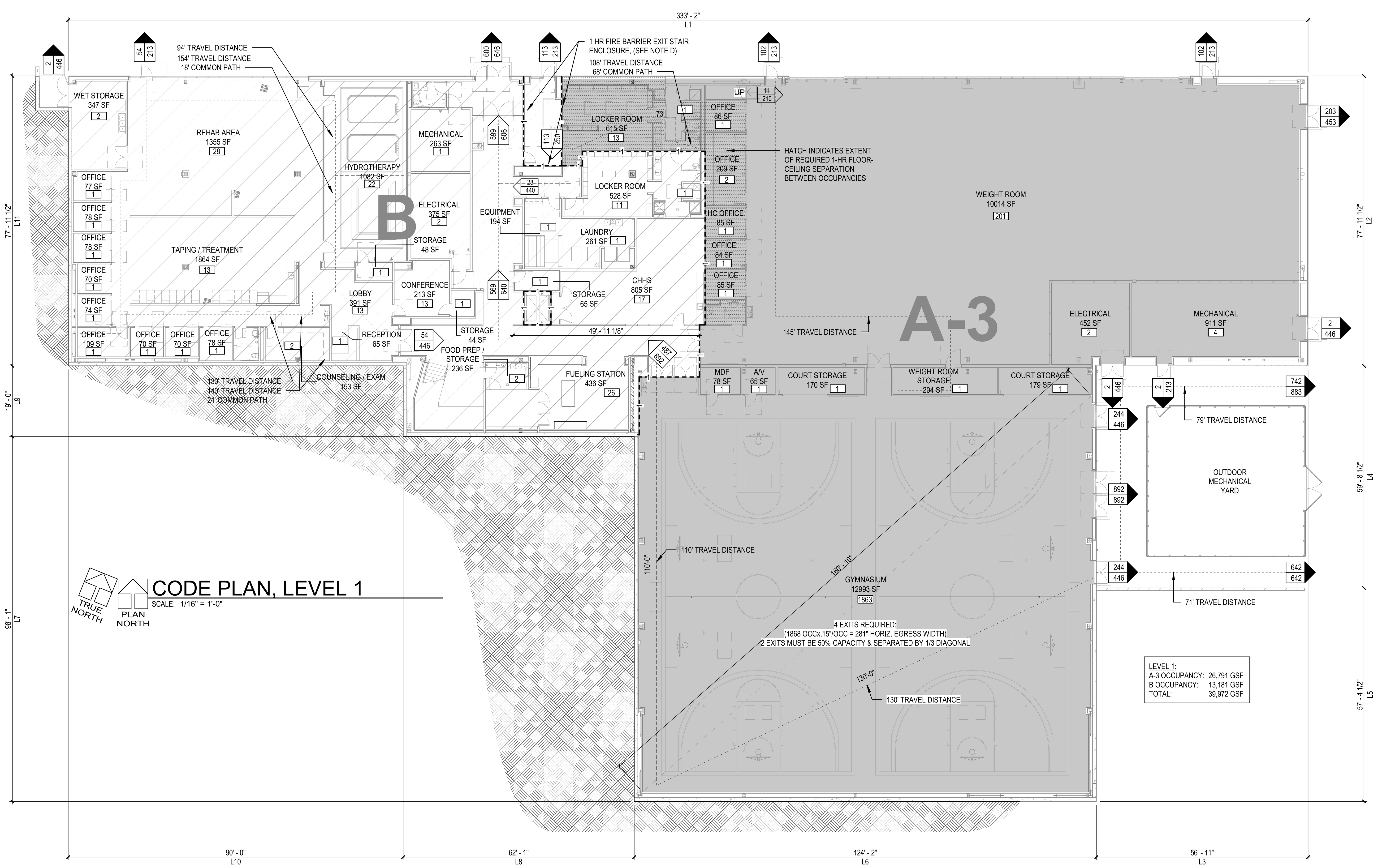
CODE PLAN, LEVEL 3 AUDITORIUM - BASE BID
SCALE: 1/16" = 1'-0"
TRUE NORTH PLAN NORTH



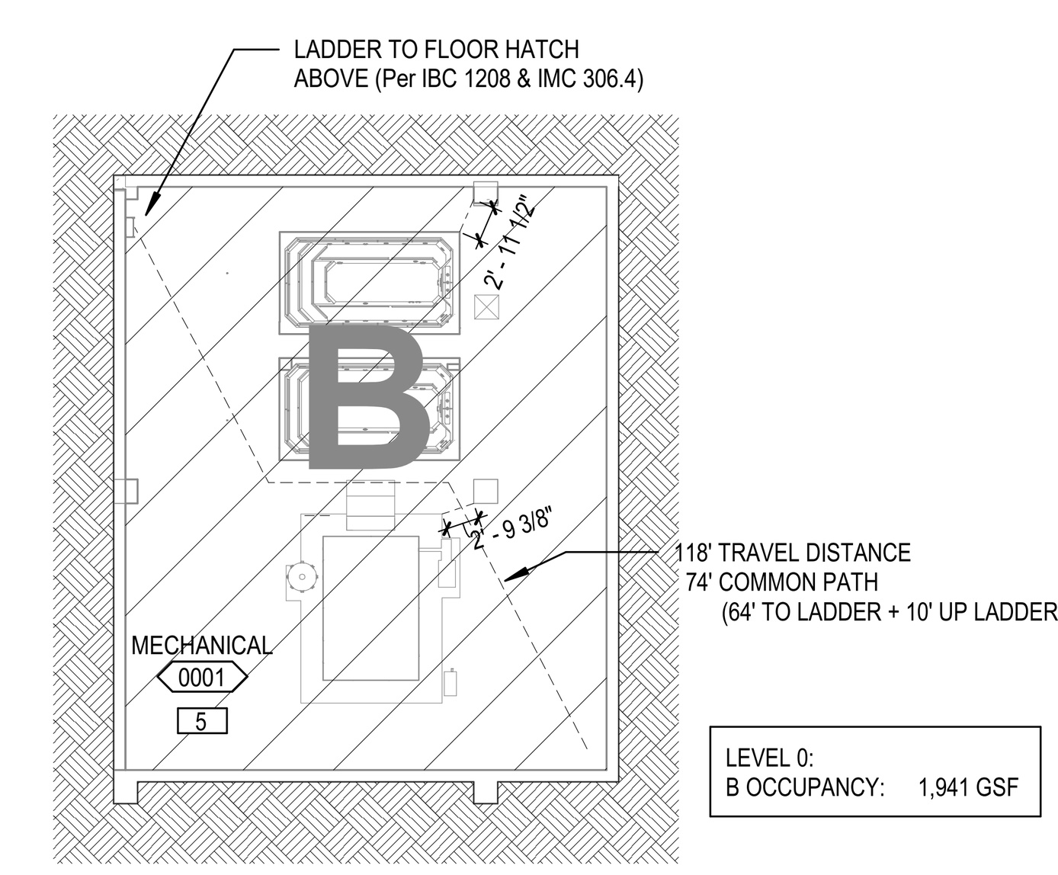
CODE PLAN, LEVEL 3
SCALE: 1/16" = 1'-0"
TRUE NORTH PLAN NORTH



CODE PLAN, LEVEL 2
SCALE: 1/16" = 1'-0"
TRUE NORTH PLAN NORTH



CODE PLAN, LEVEL 1
SCALE: 1/16" = 1'-0"
TRUE NORTH PLAN NORTH



CODE PLAN, LEVEL 0
SCALE: 1/16" = 1'-0"
TRUE NORTH PLAN NORTH

Area Schedule (Gross Building Footprint)		
Name	Area	Comments
Level 0 Area	1941 SF	Basement: (Fire Area, but not Building Area)
Level 1 Area	39969 SF	Cardio / Oxygen Mezzanine: (Adds 1,511 GSF Fire Area, Included in Level 2 Building Area)
Level 2 Area	14374 SF	Does Not include open to below Gym & Weight Room or (Alternate Patio at Level 3 Entrance)
Level 3 Area	8631 SF	
Level 3M Area	703 SF	(Adds 433 GSF via Alternate Bid)
	65618 SF	

SYMBOL LEGEND & NOTES

A. OCCUPANT LOAD BY INCREASED FOR EGRESS WHERE APPLICABLE TO ACCOUNT FOR MAXIMUM PROBABLE OCCUPANTS
B. ACADEMIC CORRIDOR WIDTHS INCREASED PER NAU GUIDELINES
C. SEE SITE LAYOUT PLAN FOR COMPONENTS BETWEEN BUILDING & PUBLIC WAY
D. RATING OF FIRE BARRIERS ALSO INCLUDES AN EQUIVALENT RATING OF ALL SUPPORTING STRUCTURAL BEAMS & COLUMNS. SEE ARCHITECTURAL FLOOR PLANS FOR EXTENTS INCLUDED BUT NOT LIMITED TO THIS REQUIREMENT.
E. SEE ARCHITECTURAL FLOOR PLANS FOR FIRE EXTINGUISHER LOCATIONS.

- EGRESS OCCUPANT LOAD

- ACCESSORY USE AREA
(OCCUPANCY LOAD IS NOT INCLUDED IN LOADS BEYOND THIS ROOM)

0 / 0 - COMBINED OCCUPANT LOAD AT A GIVEN DOOR, STAIR OR PASSAGEWAY
- TOTAL EXIT CAPACITY OF DOOR, STAIR OR PASSAGEWAY
(THE CAPACITY OF DOORS ARE DETERMINED AS FOLLOWS:
CLEAR OPENING WIDTH IN INCHES DIVIDED BY 0.15
THE CAPACITY OF STAIRS ARE DETERMINED AS FOLLOWS
WIDTH IN INCHES DIVIDED BY 0.2)

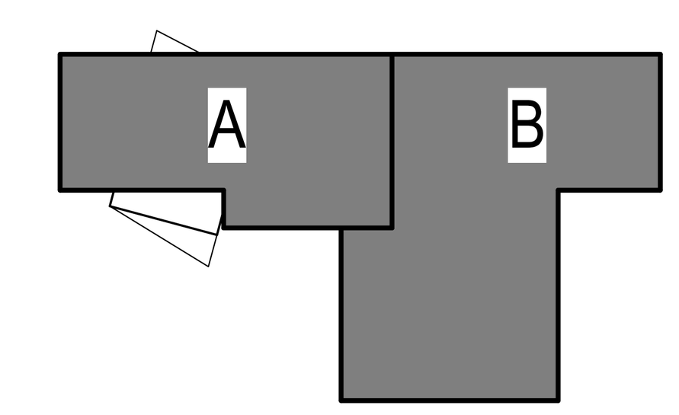
0 / 0 - COMBINED OCCUPANT LOAD AT A GIVEN DOOR (SUM OF THESE EQUALS TOTAL OCCUPANT LOAD)
- TOTAL EXIT CAPACITY OF DOOR
(THE CAPACITY OF DOORS ARE DETERMINED AS FOLLOWS:
CLEAR OPENING WIDTH IN INCHES DIVIDED BY 0.15)

WALL HOURLY RATING
1 = 1 HOUR
2 = 2 HOUR
SP = SMOKE PARTITION

EGRESS PATH
COMMON TRAVEL PATH
EXIT ACCESS TRAVEL PATH

FIRE RATING ABBREVIATIONS
C = CORRIDOR
EW = EXTERIOR WALL
FB = FIRE BARRIER
FP = FIRE PARTITION
FSB = FIRE/SMOKE BARRIER
FW = FIRE WALL
HX = HORIZONTAL EXIT
SB = SMOKE BARRIER
VS = VERTICAL SHAFT
VX = VERTICAL EXIT
XP = EXIT PASSAGEWAY

KEY PLAN



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CONSTRUCTION DOCUMENTS
06.22.2020
Revisions
ASI03 09.04.20 TRADES, AHJ REVS
ASI05 10/07/20 TRADES, AHJ REVS

Attachment G2
to ASI05
dated 10/07/20

30-19131-00

CODE FLOOR PLANS

CP1.1

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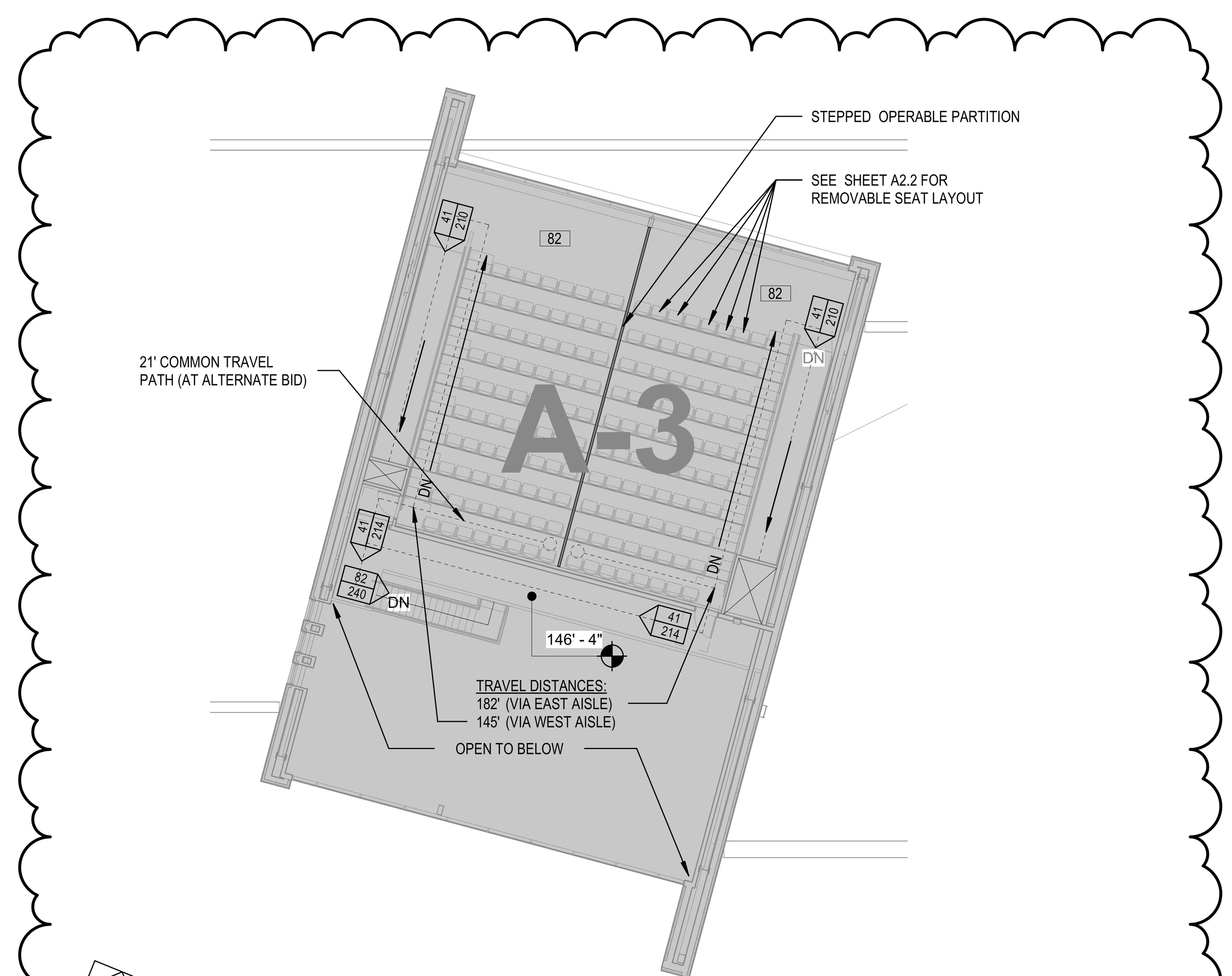

CODE PLAN, LEVEL 3 AUDITORIUM - ALTERNATE
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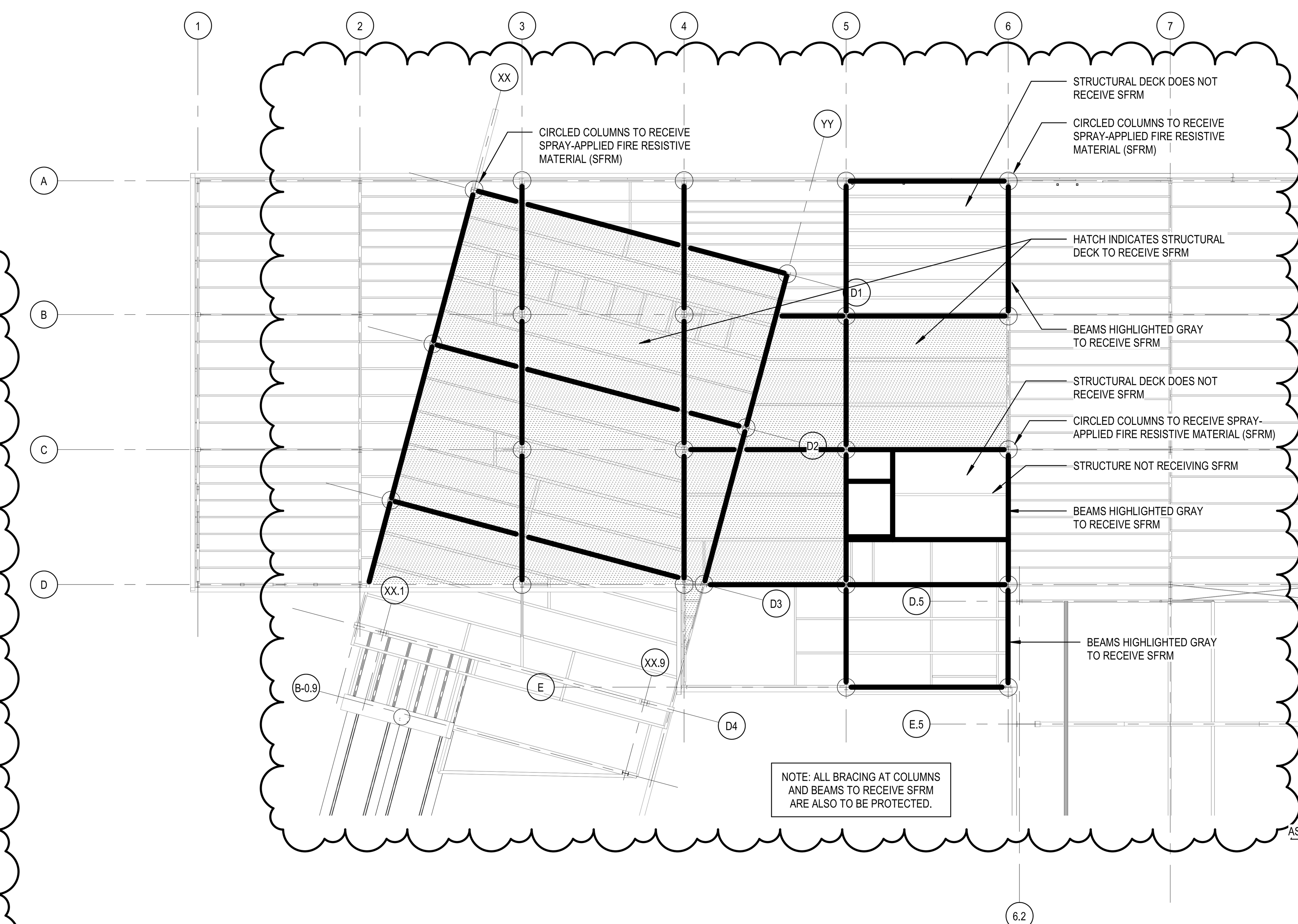
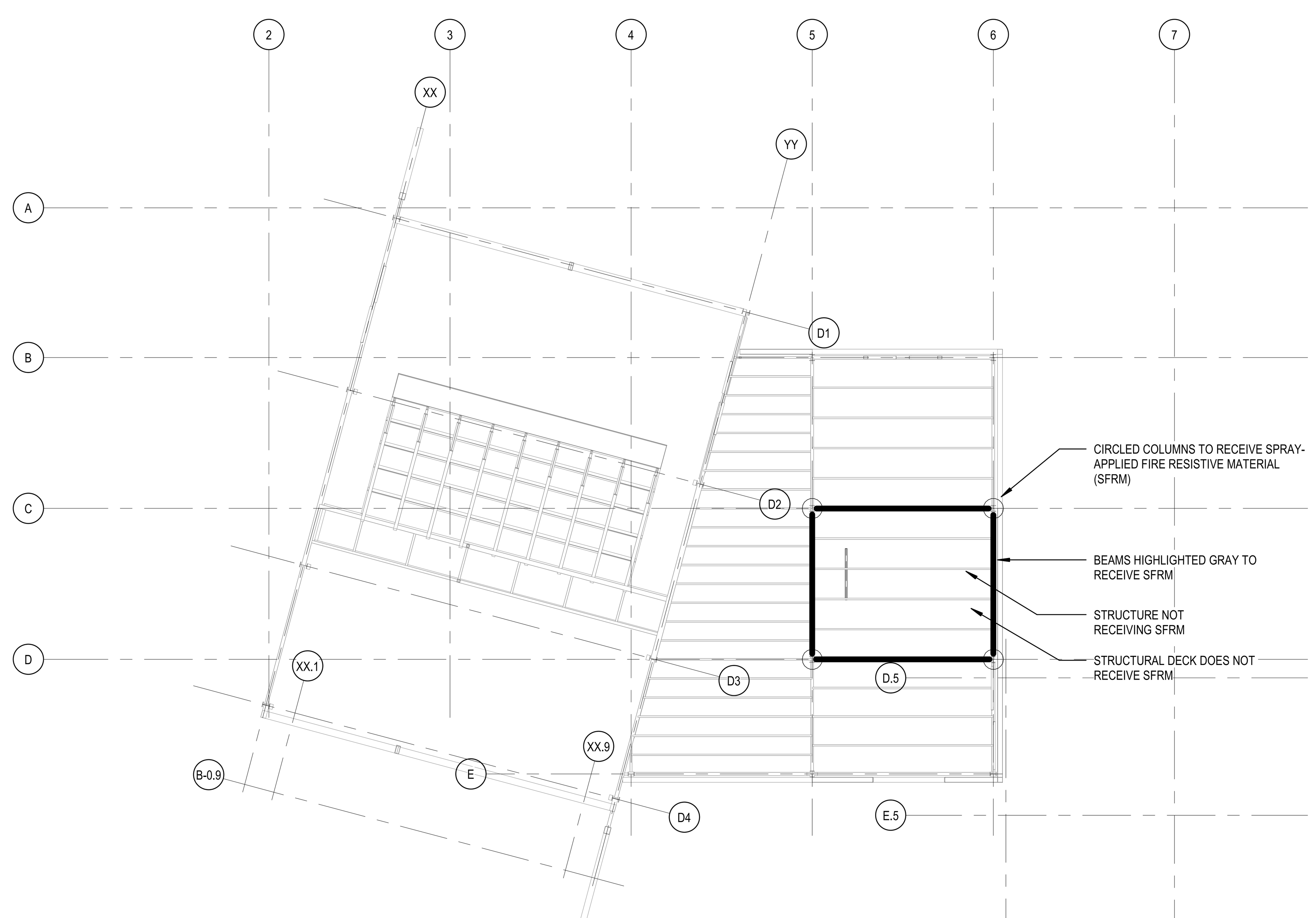
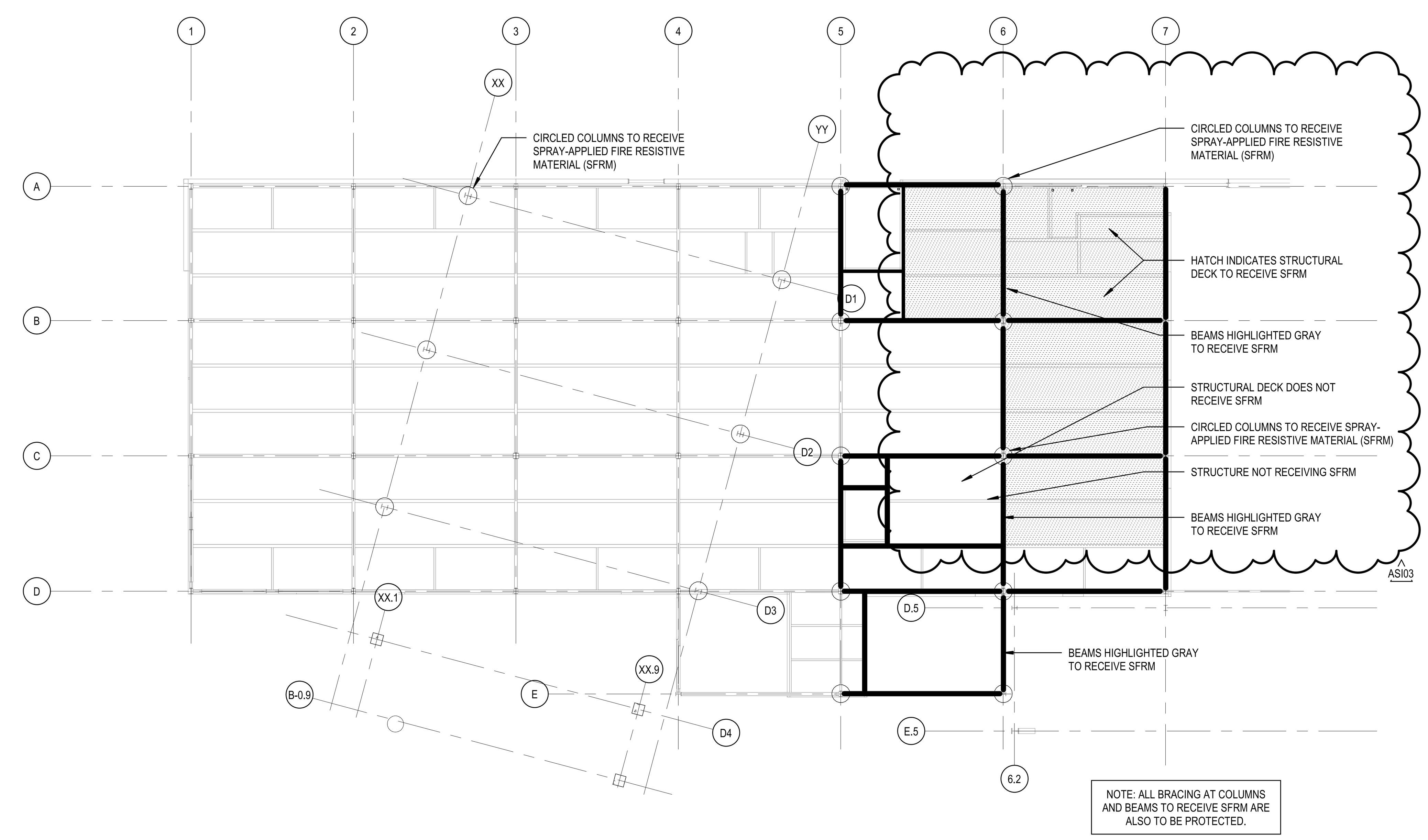


45 LEVEL 2 SPRAY-APPLIED FIRE RESISTIVE MATERIAL LOCATIONS
CP1.1A SCALE: 1/16" = 1'-0"



26 LEVEL 3 SPRAY-APPLIED FIRE RESISTIVE MATERIAL LOCATIONS
CP1.1A SCALE: 1/16" = 1'-0"



55 LEVEL 1 SPRAY-APPLIED FIRE RESISTIVE MATERIAL LOCATIONS
CP1.1A SCALE: 1/16" = 1'-0"

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CONSTRUCTION DOCUMENTS
06.22.2020
Revisions
RFI32 7/23/20 FOUNDATION DRAIN PIPE
ASI03 09.04.20 TRADES, AHU REVS

30-19131-00

SPRAY-APPLIED FIRE RESISTIVE MATERIAL LOCATIONS

CP1.1A

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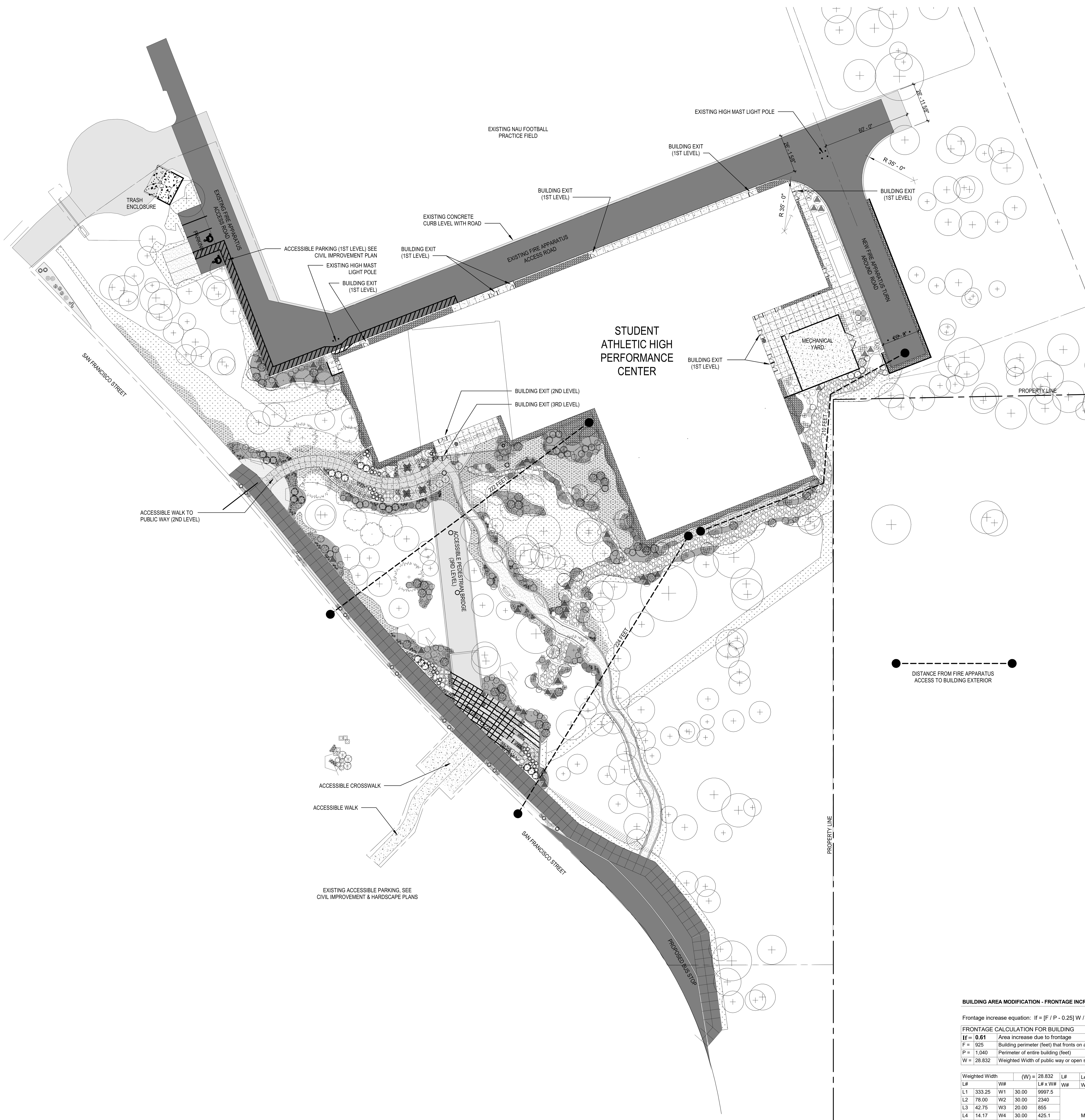

BUILDING AREA MODIFICATION - FRONTAGE INCREASE PER IBC SECTION 506.2

Frontage increase equation: If = [F / P - 0.25] W / 30

FRONTAGE CALCULATION FOR BUILDING		
If =	**0.61**	Area increase due to frontage
F =	925	Building perimeter (feet) that fronts on a public way or open spacing having 20 feet open minimum width
P =	1,040	Perimeter of entire building (feet)
W =	28.832	Weighted Width of public way or open space (feet) in accordance with equation 5-3.

Weighted Width			(W) =	28.832	L#	Length of associated portion of exterior perimeter wall
L#		W#		L# x W#	W#	Width of open space associated with L# portion of exterior perimeter wall
L1	333.25	W1	30.00	9997.5		
L2	78.00	W2	30.00	2340		
L3	42.75	W3	20.00	855		
L4	14.17	W4	30.00	425.1		Mechanical Yard limits width of Open Space
L5	20.00	W5	30.00	600		
L6	39.33	W6	14.17	0		Mechanical Yard limits width of Open Space
L7	29.00	W7	25.67	744.43		Fence on property limits width of Open Space
L8	15.00	W8	14.17	0		Fence on property limits width of Open Space
L9	124.25	W9	30.00	3727.5		
L10	98.08	W10	30.00	2942.4		
L11	62.08	W11	30.00	1862.4		
L12	19.00	W12	0.00	0		Pedestrian Bridge limits width of Open Space
L13	61.25	W13	0.00	0		Pedestrian Bridge limits width of Open Space
L14	2.67	W14	25.00	66.75		
L15	26.08	W15	30.00	782.4		
L16	78.00	W16	30.00	2340		

1 CP1.2 CODE SITE PLAN
SCALE: 1" = 30'-0"

NORTH

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CONSTRUCTION DOCUMENTS
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CODE SITE PLAN

CP1.2

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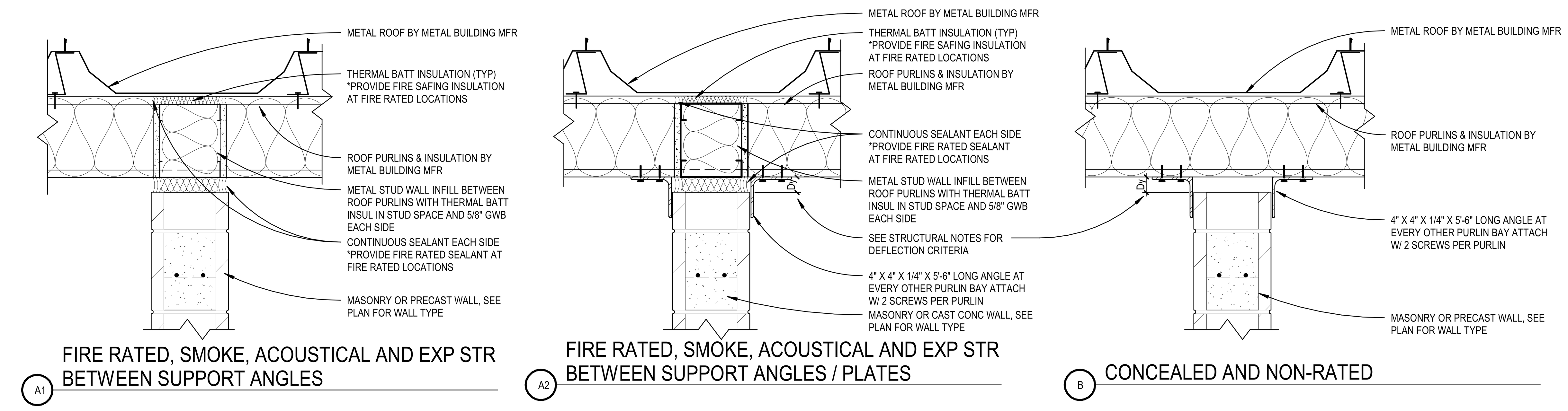
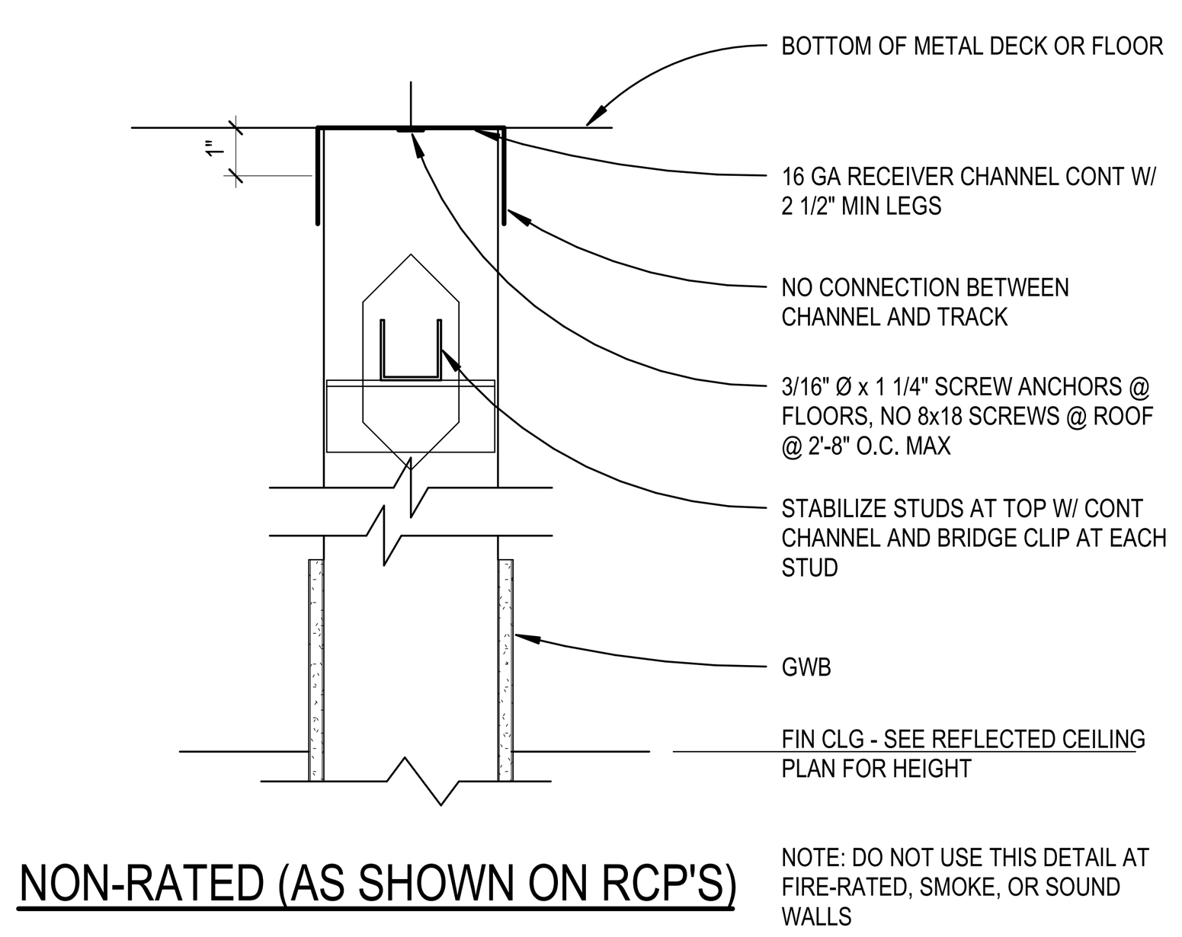
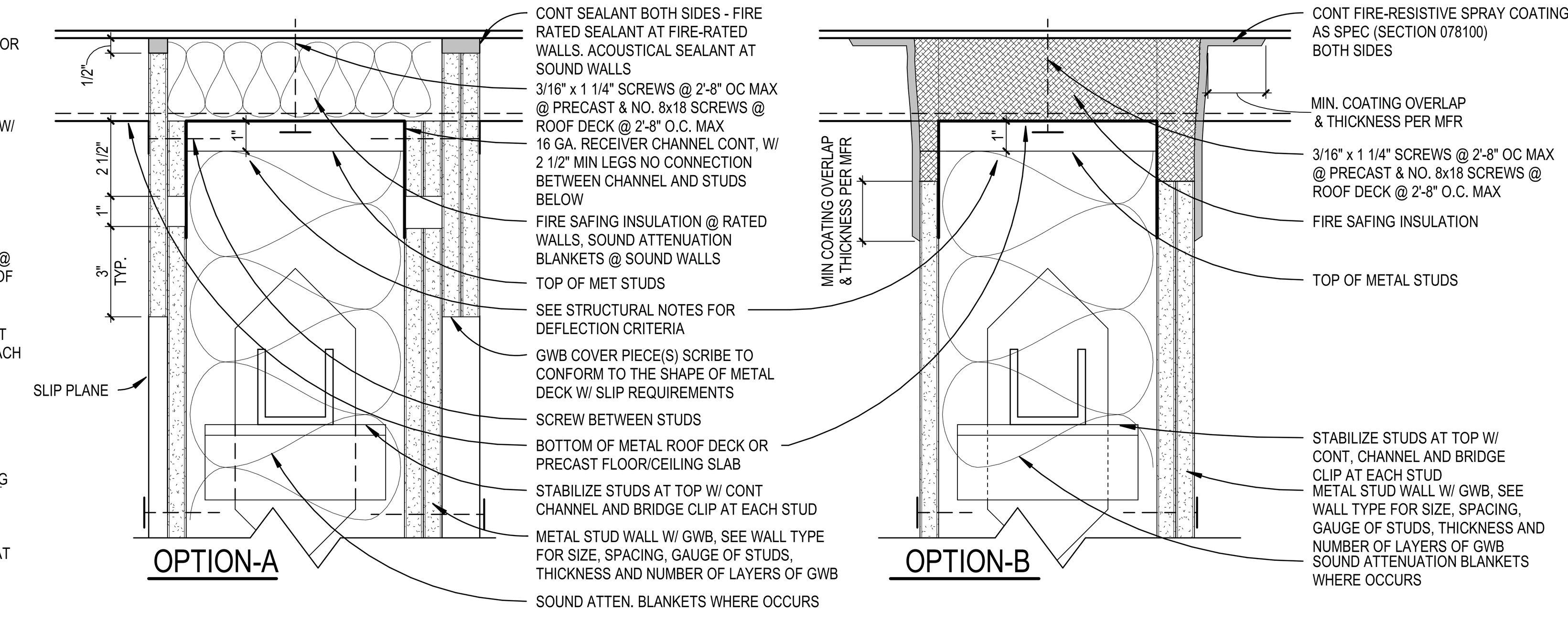


11 CP2.1 **MASONRY TOP OF WALL DETAILS PERPENDICULAR TO ROOF PURLINS AT METAL BUILDING SYSTEM**
SCALE: 1 1/2" = 1'-0"



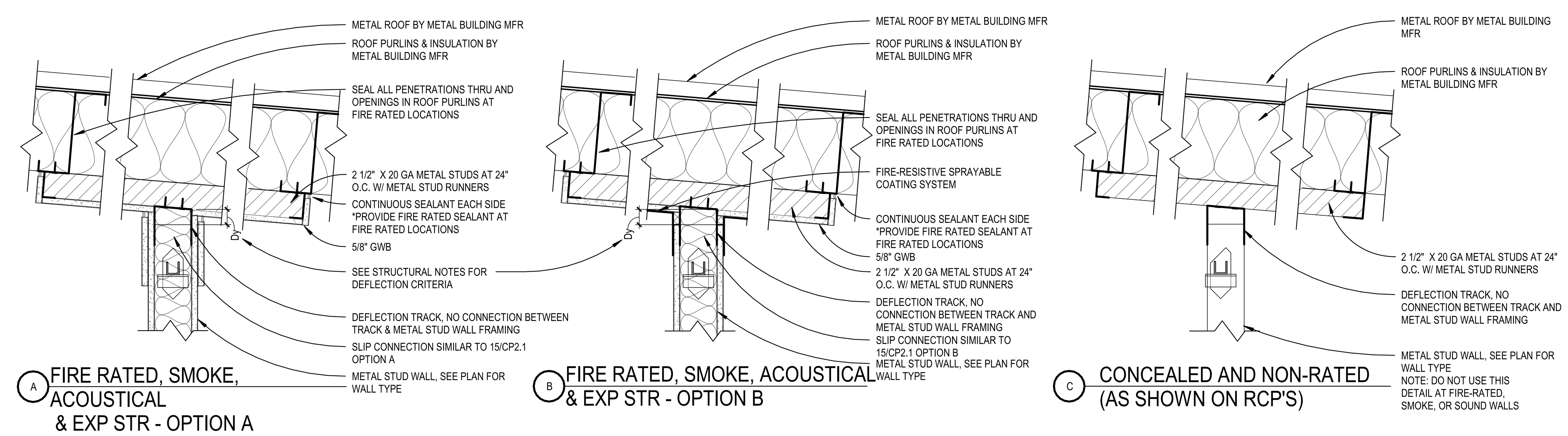
14 CP2.1 **NON RATED SLIP CONNECTION**
SCALE: 1 1/2" = 1'-0"



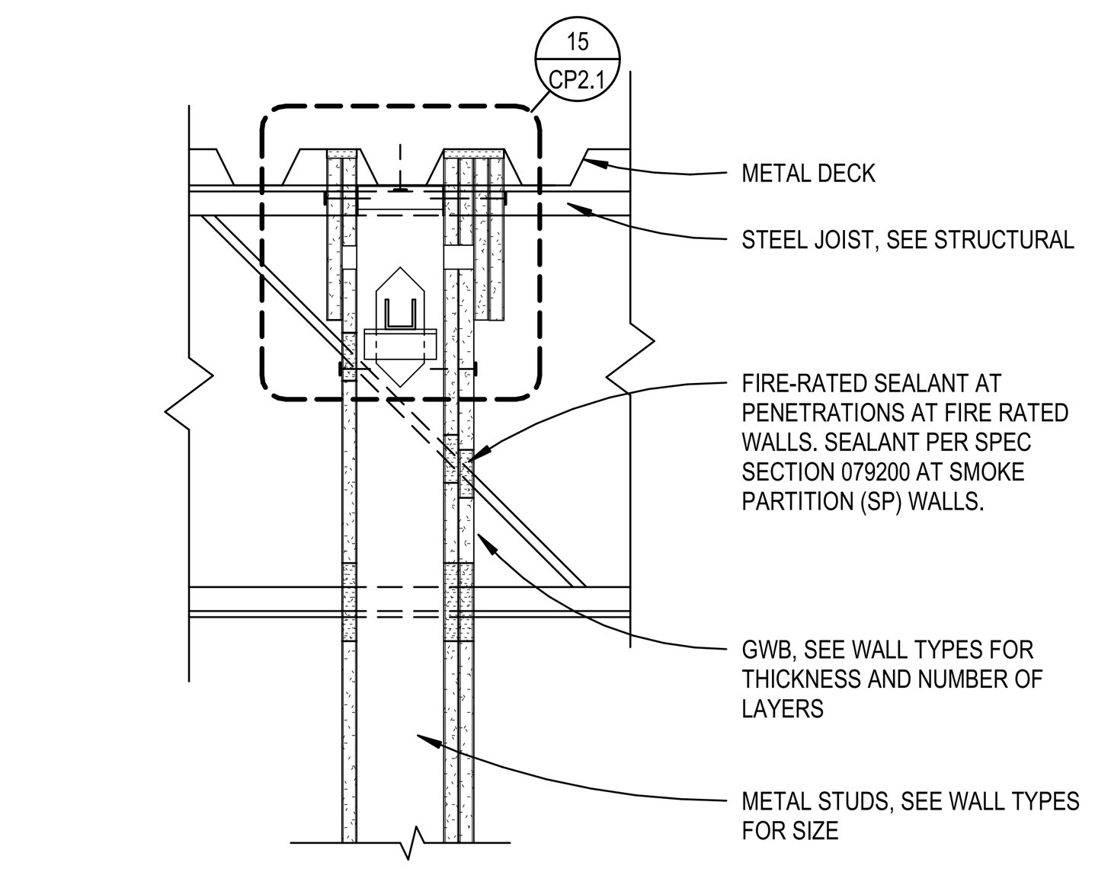
NOTE: THESE DETAILS ARE ALSO REQUIRED AT ANY SMOKE PARTITION (SP) WALLS. SEE CODE PLAN FOR LOCATIONS

NOTE: REQUIRED FOR ALL SMOKESTOP AND FIRE-RATED WALLS, SOUND WALLS, AND WALLS IN ROOMS W/ EXP STR.

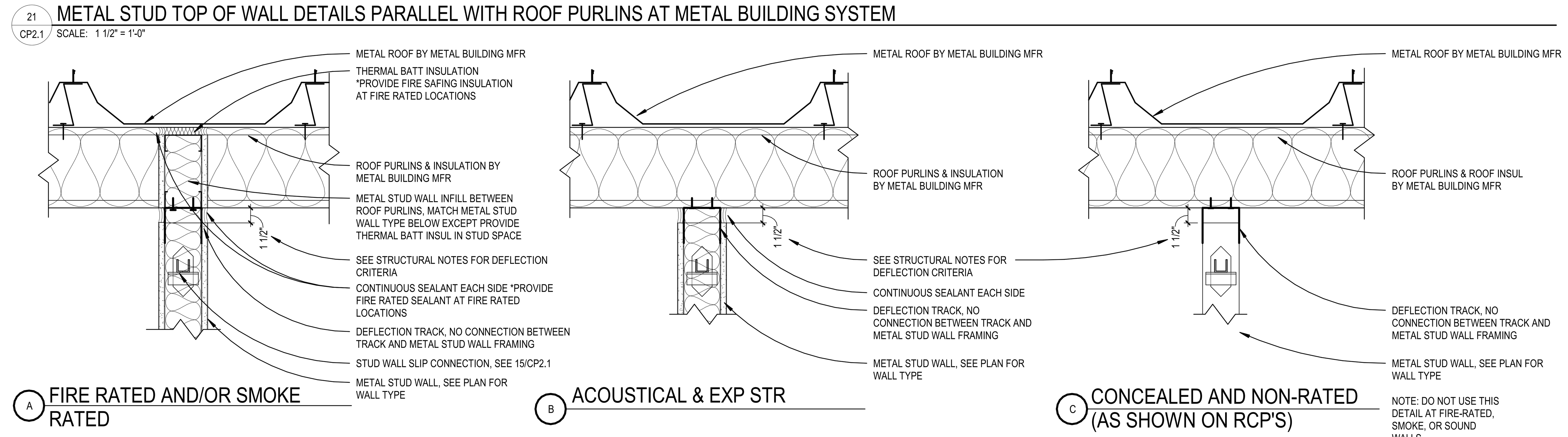
15 CP2.1 **STUD WALL SLIP CONNECTION DETAILS**
SCALE: 3" = 1'-0"



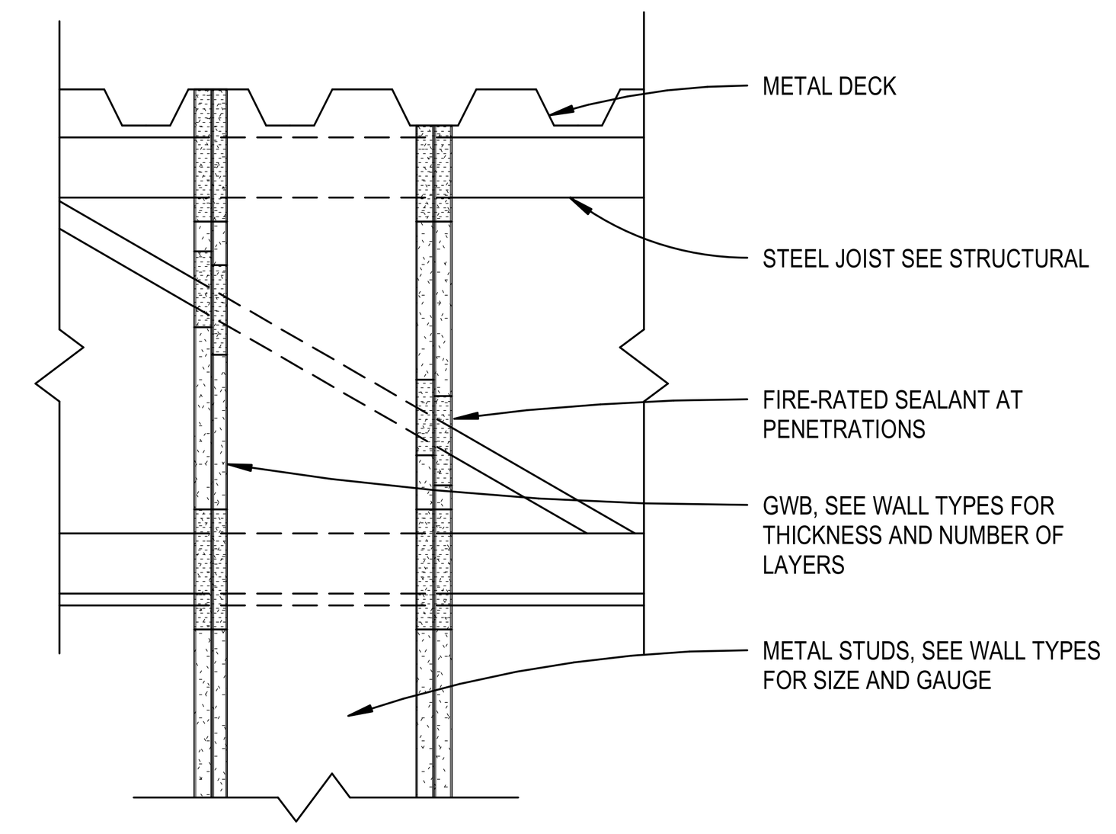
21 CP2.1 **METAL STUD TOP OF WALL DETAILS PARALLEL WITH ROOF PURLINS AT METAL BUILDING SYSTEM**
SCALE: 1 1/2" = 1'-0"



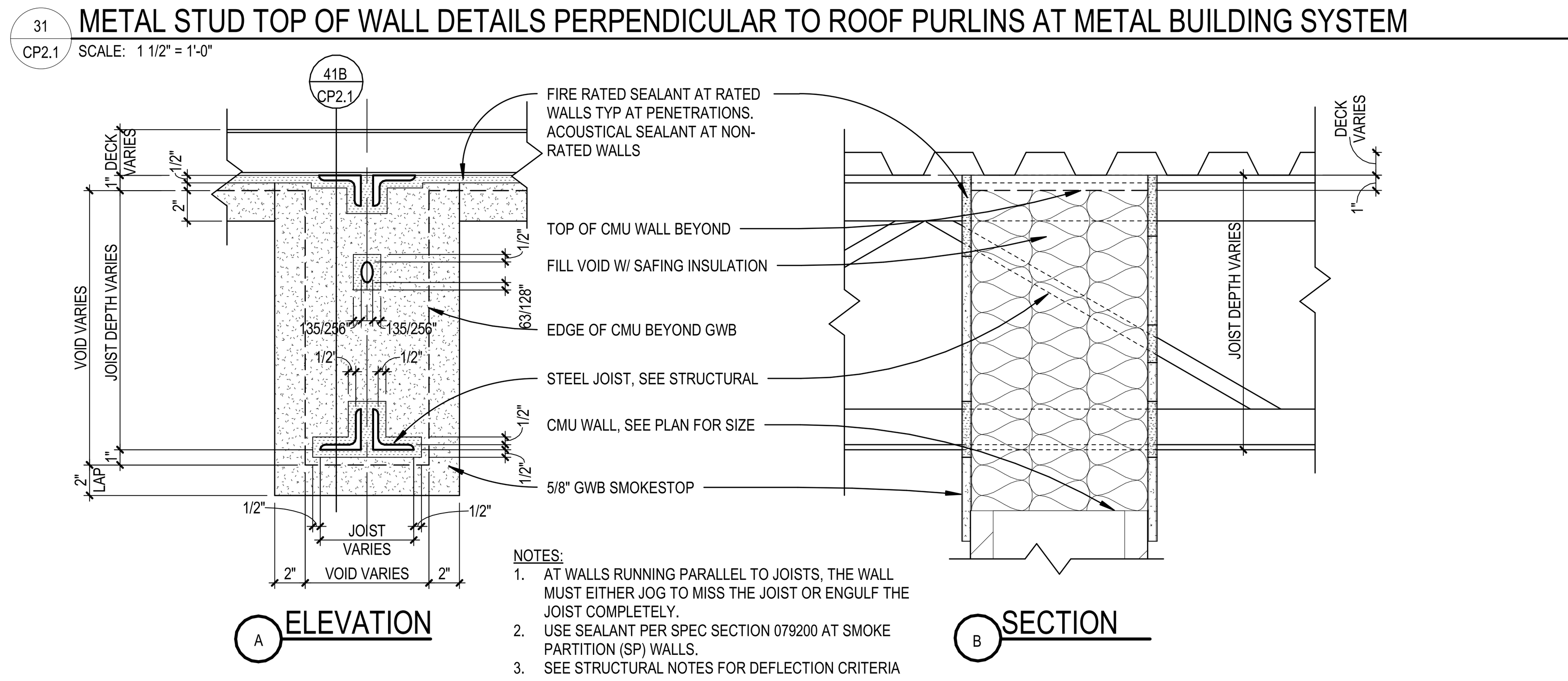
24 CP2.1 **FIRE/SMOKESTOP AT GWB WALL**
SCALE: 1 1/2" = 1'-0"



31 CP2.1 **METAL STUD TOP OF WALL DETAILS PERPENDICULAR TO ROOF PURLINS AT METAL BUILDING SYSTEM**
SCALE: 1 1/2" = 1'-0"

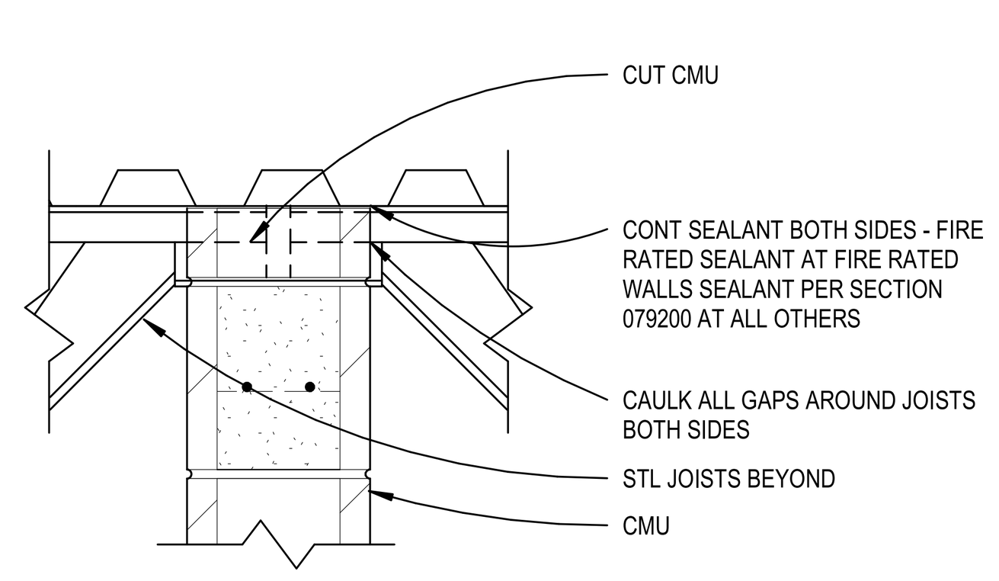


34 CP2.1 **CD-GWB-FIRESMOKE STOP**
SCALE: 1 1/2" = 1'-0"

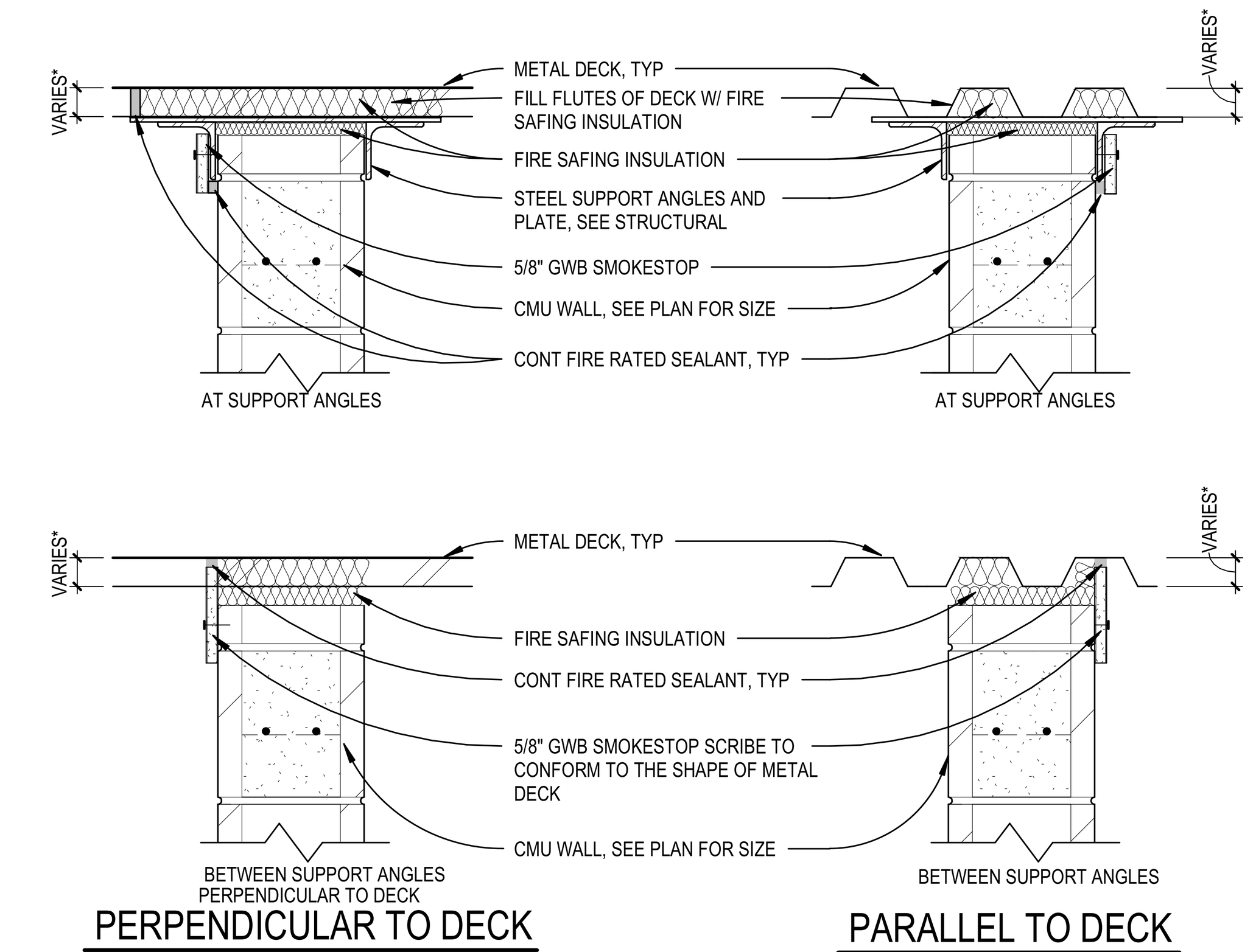


NOTES:
1. AT WALLS RUNNING PARALLEL TO JOISTS, THE WALL MUST EITHER JOG TO MISS THE JOIST OR ENGULF THE JOIST COMPLETELY.
2. USE SEALANT PER SPEC SECTION 079200 AT SMOKE PARTITION (SP) WALLS.
3. SEE STRUCTURAL NOTES FOR DEFLECTION CRITERIA

41 CP2.1 **JOIST PENETRATION @ CMU**
SCALE: 1 1/2" = 1'-0"

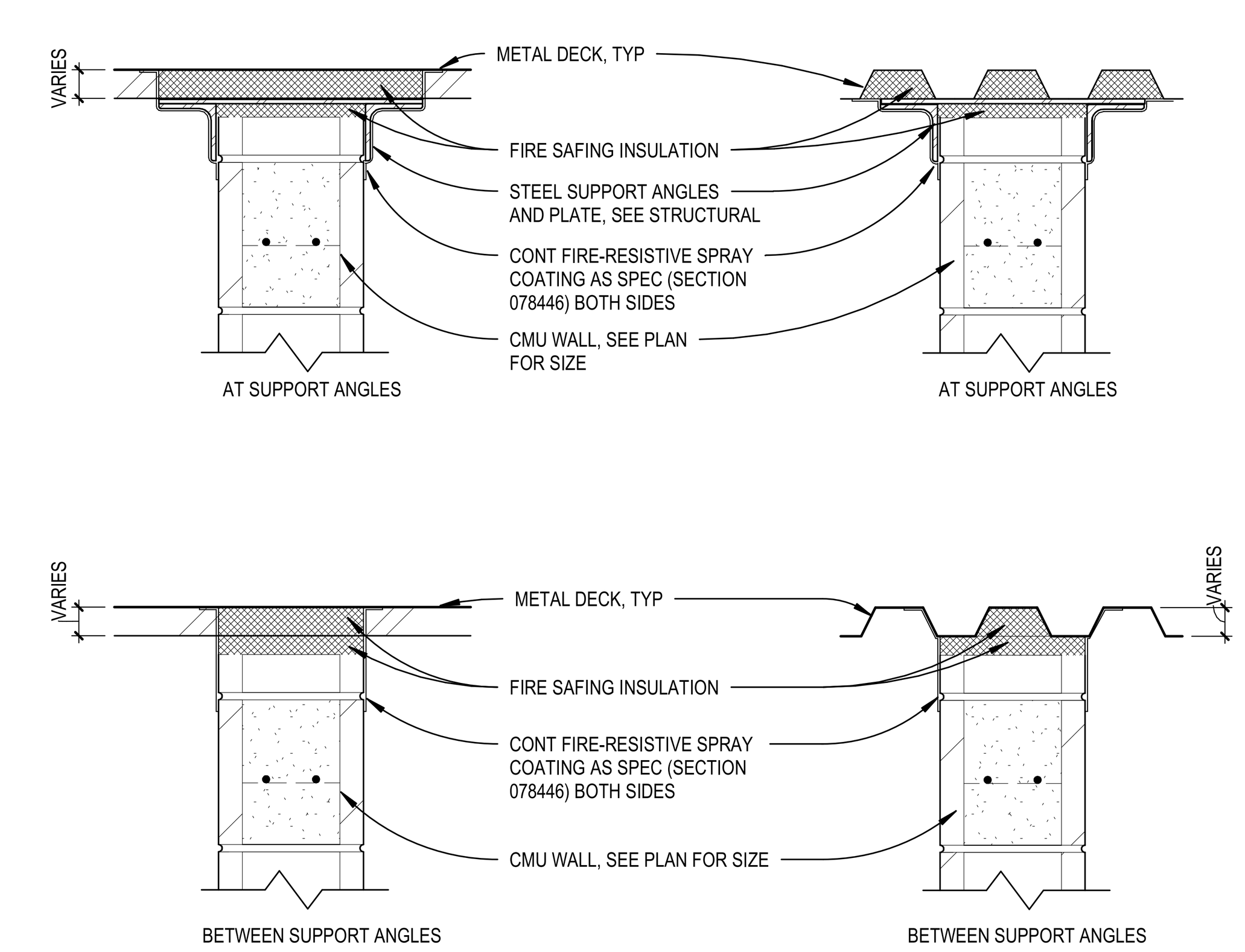


43 CP2.1 **BEARING CONDITION DETAIL**
SCALE: 1 1/2" = 1'-0"



*NOTES:
USE SEALANT PER SPEC SECTION 079200 AT SMOKE PARTITION (SP) WALLS.
SEE STRUCTURAL NOTES FOR DEFLECTION CRITERIA

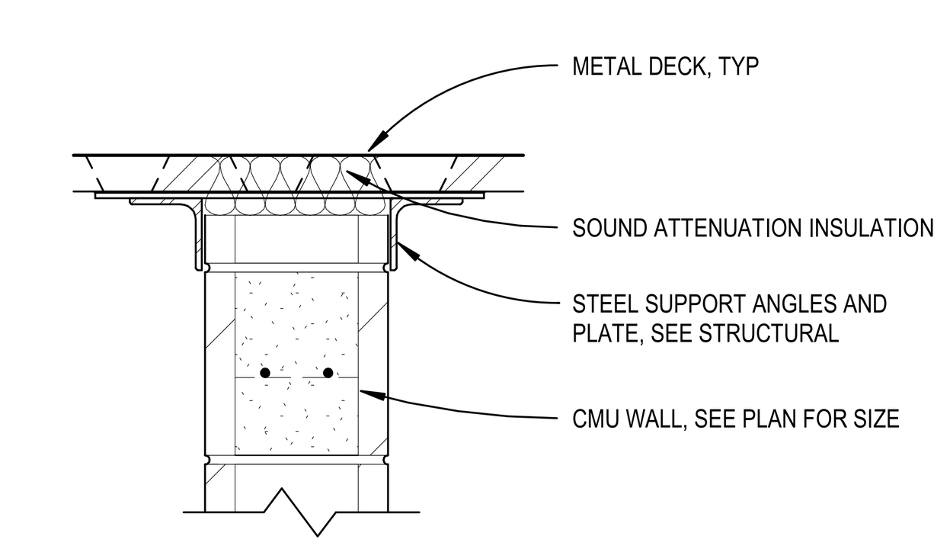
A **OPTION-A: FIRE AND/OR SMOKE RATED CONDITION**



NOTE: THESE DETAILS ARE ALSO REQUIRED AT ALL ZERO-RATED CORRIDOR WALLS (O-C). SEE CODE PLAN FOR LOCATIONS.

PERPENDICULAR TO DECK — PARALLEL TO DECK

B **OPTION-B: FIRE AND/OR SMOKE RATED CONDITION**



NOTE: DO NOT USE @ ZERO-RATED CORRIDOR (O-C) OR SMOKE PARTITIONS (SP)

C **NON RATED CONDITION**

55 CP2.1 **TYPICAL CMU WALL SLIP CONNECTION DETAILS**
SCALE: 1 1/2" = 1'-0"

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Revisions

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CODE DETAILS

CP2.1

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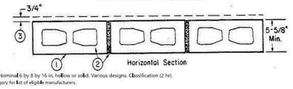

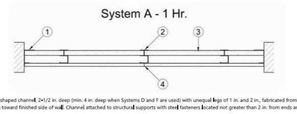

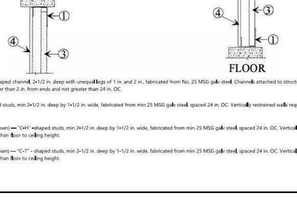

Design No. U906

March 02, 2020

Bearing Wall Rating — 2 HR.

Nonbearing Wall Rating — 2 HR.

This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Concrete Blocks*** — Nominal 6 by 8 by 16 in, hollow or solid. Various designs. Classification (2 hr).
See **Concrete Blocks** category for list of eligible manufacturers.

ANCHOR CONCRETE PRODUCTS INC

GAGNE & SON CONCRETE BLOCK INC

GLENWOOD MASONRY PRODUCTS

Allowable compressive stress of 57% of max allowable compressive stress in accordance with the empirical design method.

OLDCASTLE APG SOUTH INC, DBA ADAMS PRODUCTS

WESTBROOK CONCRETE BLOCK CO INC

Allowable compressive stress of 75.6% of max allowable compressive stress in accordance with the empirical design method.

2. **Mortar** — Blocks laid in full bed of mortar, nom. 3/8 in. thick, of not less than 2-1/4 and not more than 3-1/2 parts of clean sharp sand to 1 part Portland cement (proportioned by volume) and not more than 50 percent hydrated lime (by cement volume). Vertical joints staggered.

3. **Portland Cement Stucco or Gypsum Plaster** — Add 1/2 hr to Classification if used. Attached to concrete blocks (Item 1).

4. **Foamed Plastic*** — (Optional-Not Shown) — 1-1/2 in. thick max, 4 ft wide sheathing attached to concrete blocks (Item 1).
ATLAS ROOFING CORP — "EnergyShield Pro Wall Insulation", "EnergyShield Pro 2 Wall Insulation", EnergyShield CGF Pro and EnergyShield Ply Pro

CARLISLE COATINGS & WATERPROOFING INC — Type R2+ SHEATHE

DUPONT DE NEMOURS, INC. — Types Thermax Sheathing, Thermax Light Duty Insulation, Thermax Heavy Duty Insulation, Thermax Metal Building Board, Thermax White Finish Insulation, Thermax ci Exterior Insulation, Thermax XARMOR ci Exterior Insulation, Thermax IH Insulation, Thermax Plus Liner Panel, Thermax Heavy Duty Plus (HDP), TUFF-R™ ci Insulation, Thermax Butler Stylwall Insulation Board and Thermax Morton Heavy Duty Insulation Board

FIRESTONE BUILDING PRODUCTS CO L L C — "Enverge™ CI Foil Exterior Wall Insulation" and "Enverge™ CI Glass Exterior Wall Insulation"

HUNTER PANELS, A DIVISION OF CARLISLE CONSTRUCTION MATERIALS, LLC — Types "Xci-Class A", "Xci 286", "Xci Foil (Class A)"

RMAX, A BUSINESS UNIT OF SIKA CORPORATION — Types "TSX-8500", "ECOMAXci FR", "TSX-8510", "ECOMAX xi FR White", "ECOMAXci", "ECOMAXci FR Air Barrier", "Thermasheath-XP", "Thermasheath", "Durasheath", "Thermasheath-3", "Durasheath-3".

4A. **Building Units** — As an alternate to Item 5, min. 1-in thick polyisocyanurate composite foamed plastic insulation boards, nom. 48 by 48 or 96 in.
RMAX, A BUSINESS UNIT OF SIKA CORPORATION — "Thermasheath-SI", "ECOBASEci", "ThermaBase-CI", "ECOMAXci FR Ply", "ECOMAXci Ply"

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2020-03-02

Design No. W419

October 02, 2019

Nonbearing Wall Rating — 1, 2, 3, or 4 Hr.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Channel Track** — "J" -shaped channel, 2-1/2 in. deep (min. 4 in. deep when Systems D and F are used) with unequal legs of 1 in. and 2 in., fabricated from No. 25 MSG galv steel. Channel positioned with short leg toward finished side of wall. Channel attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** — (Not shown) "I" -shaped studs, min 2-1/2 in. deep (min. 4 in. deep when System F is used, not for use with System D) by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 1/2 in. less than floor to ceiling height and spaced 24 in. OC.

2A. **Steel Studs** — — "C-H" -shaped studs, min 2-1/2 in. deep (min. 4 in. deep when Systems D and F are used) by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 1/2 in. less than floor to ceiling height and spaced 24 in. OC.

2B. **Steel Studs** — (Not Shown) — "C-T" - shaped studs, min 2-1/2 in. deep (min. 4 in. deep when Systems D and F are used) by 1-1/2 in. wide, fabricated from min 25 MSG galv steel. Cut to lengths 1/2 in. less than floor to ceiling height and spaced 24 in. OC.

2C. **Furring Channels** — (Optional, Not Shown) — For use with single or double layer systems. Resilient furring channels fabricated from min. 25 MSG corrosion protected steel, installed horizontally, and spaced vertically a max. 24 in. OC. Flange portion of channel attached to each intersecting stud on side of stud opposite the 1 in. liner panels with 1/2 in. long Type S or S-12 pan-head steel screws. When furring channels are used, gypsum board to be installed vertically.

2D. **Steel Framing Members*** — (Optional, Not Shown) — For use with single or double layer systems. Furring channels and Steel Framing Members as described below. Not to be used with cementitious backer units (Item 7):

a. **Furring Channels** — Formed of No. 25 MSG galv steel, 2-3/8 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board installed vertically only and attached to furring channels as described in Item 4.

b. **Steel Framing Members*** — Used to attach furring channels (Item 2Da) to studs (Items 2, 2A, or 2B). Clips spaced max. 24 in. OC., and secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring channels are friction fitted into clips.
PAC INTERNATIONAL L L C — Types RSIC-1

2E. **Furring Channels** — For use with System F. "Hat" shaped, min. 22 MSG galv steel furring channels attached directly over the three inner layers of wallboard to each stud with 2-1/4 in. long Type S bugle head steel screws. Screws alternate from top flange to bottom flange at each stud intersection. Furring channels spaced vertically max 16 in. OC.

2F. **Steel Framing Members*** — (Optional, Not Shown) — For use with single or double layer systems. Furring channels and Steel Framing Members as described below. Not to be used with cementitious backer units (Item 7):

a. **Furring Channels** — Formed of No. 25 MSG galv steel, 2-5/8 in. wide by 7/8 in deep, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel wire. Gypsum board installed vertically only and attached to furring channels as described in Item 4.

b. **Steel Framing Members*** — Used to attach furring channels (Item 2Fa) to studs (Items 2, 2A, or 2B). Clips spaced 24 in. OC, and secured to studs with 2 in. coarse drywall screw with 1 in. diam washer through the center hole. Furring channels are friction fitted into clips.
STUDCO BUILDING SYSTEMS — RESILMOUNT Sound Isolation Clips - Type A237R

2G. **Steel Framing Members*** — (Optional, Not Shown) — For use with single or double layer systems. Furring channels and Steel Framing Members as described below. Not to be used with cementitious backer units (Item 7):

a. **Furring Channels** — Formed of No. 25 MSG galv steel, spaced 24 in. OC, and perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and secured in place with a double strand of No. 18 AWG twisted steel wire. Gypsum board installed vertically only and attached to furring channels as described in Item 4.

b. **Steel Framing Members*** — Used to attach furring channels (Item 2Ga) to studs (Items 2, 2A, or 2B). Clips spaced 24 in. OC, and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Furring channels are friction fitted into clips.
REGUPOL AMERICA — Type SonusClip

2H. **Steel Framing Members*** — (Optional, Not Shown) — For use with single or double layer systems. Resilient channels and Steel Framing Members as described below. Not to be used with cementitious backer units (Item 7):

a. **Resilient Channels** — Formed of No. 25 MSG galv steel, spaced 24 in. OC, and perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and secured in place with two No. 8 15 x 1/2 in. Philips Modified Truss screws spaced 2-1/2 in. from the center of the overlap. Gypsum board attached to resilient channels as described in Item 4.

b. **Steel Framing Members*** — Used to attach resilient channels (Item 2Ha) to studs. Clips spaced 48 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Resilient channels are secured to clips with one No. 10 x 1/2 in. pan-head self-drilling screw.
KEENE BUILDING PRODUCTS CO INC — Type RC+ Assurance Clip

3. **Gypsum Board*** — 1 in. thick gypsum wallboard liner panels, supplied in nom 24 in. widths. Panels cut 1 in. less in length than floor to ceiling heights. Vertical edges inserted in "I" studs. Free edge of end panels attached to long leg of channel track with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced not greater than 24 in. OC. For System F, screws spaced not greater than 12 in. OC.
NATIONAL GYPSUM CO — Types FSW, FSW-B, FSW-7

System A - 1 Hr.

4. **Gypsum Board*** — 5/8 in. thick, 4 ft wide, applied horizontally or vertically and attached to studs with 1 in. long Type S steel screws spaced 12 in. OC along the edges and in the field of the boards. When Furring Channels (Item 2C) are used, gypsum board attached vertically to furring channels with 1 in. long Type S steel screws spaced 12 in. OC.
NATIONAL GYPSUM CO — Types eXP-C, FSK, FSK-C, FSL, FSMR-C, FSW, FSW-3, FSW-5, FSW-C, FSW-6, and FSW-8

4A. **Gypsum Board*** — (As an alternate to item 4) - 5/8 in. thick, 4 ft wide, applied vertically and attached to studs with 1 in. long Type S steel screws spaced 12 in. OC along the edges and in the field of the boards. When Furring Channels (Item 2C) are used, gypsum board attached vertically to furring channels with 1 in. long Type S steel screws spaced 12 in. OC.
NATIONAL GYPSUM CO — Types FSW-3, FSMR-C.

4B. **Gypsum Board*** — (As an alternate to Items 4 through 4A) — Installed as described in Item 4. 5/8 in. thick, 4 ft. wide, paper surfaced, applied vertically and fastened to the studs with 1 in. long Type S steel screws spaced 8 in. OC.
NATIONAL GYPSUM CO — Type SBCB

4C. **Gypsum Board*** — (As an alternate to 5/8 in. Type FSW in Item 4) — 2 layers nom. 5/16 in. thick gypsum panels applied vertically or horizontally. Horizontal joints on the same side need not be staggered. Inner layer attached with fasteners, as described in item 4, spaced 24 in. OC. Outer layer attached per Item 4.
NATIONAL GYPSUM CO — Type FSW

See UL Directory for W419 Systems not shown here: B, C, D - 2 Hr, E - 3 Hr & F - 4 Hr

Design No. U499

October 02, 2019

Nonbearing Wall Rating — 1 Hr.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Channel Track** — "J" -shaped channel, 2-1/2 in. deep with unequal legs of 1 in. and 2 in., fabricated from No. 25 MSG galv steel. Channels attached to structural supports with steel fasteners located not greater than 2 in. from ends and not greater than 24 in. OC.

2. **Steel Studs** — "I" shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2A. **Steel Studs** — (Not Shown) — "C-H" -shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2B. **Steel Studs** — (Not Shown) — "C-T" - shaped studs, min 2-1/2 in. deep by 1-1/2 in. wide, fabricated from min 25 MSG galv steel, spaced 24 in. OC. Vertically restrained walls require studs to be cut 1/2 in. less than floor to ceiling height.

2C. **Furring Channels** — (Optional, not shown) - Resilient furring channels fabricated from min. 25 MSG corrosion protected steel, installed horizontally, and spaced vertically a max. 24 in. OC. Flange portion of channel attached to each intersecting stud on side of stud opposite the 1 in. liner panels with 1/2 in. long Type S or S-12 pan-head steel screws. When furring channels are used, wallboard to be installed vertically only.

3. **Gypsum Board*** — 1 in. thick gypsum wallboard liner panels, supplied in nominal 24 in. widths. Vertical edges inserted in "I" studs. Free edge of end panels attached to long leg of "J" runners with 1-5/8 in. long Type S self-drilling, self-tapping bugle head steel screws spaced not greater than 24 in. OC.
NATIONAL GYPSUM CO — Types FSW, FSW-B, FSW-7, FSW-9

4. **Gypsum Board*** — 5/8 in. thick, 4 ft wide, applied horizontally or vertically and attached to studs with 1 in. long Type S steel screws spaced 12 in. OC along the edges and in the field of the boards. When Furring Channels (Item 2C) are used, gypsum board attached vertically to furring channels with 1 in. long Type S steel screws spaced 12 in. OC.
NATIONAL GYPSUM CO — Types eXP-C, FSK, FSK-C, FSL, FSMR-C, FSW, FSW-3, FSW-5, FSW-C, FSW-6.

4A. **Gypsum Board*** — 5/8 in. thick, 4 ft wide, applied vertically and attached to studs with 1 in. long Type S steel screws spaced 12 in. OC along the edges and in the field of the boards. When Furring Channels (Item 2C) are used, gypsum board attached vertically to furring channels with 1 in. long Type S steel screws spaced 12 in. OC.
NATIONAL GYPSUM CO — Types FSW-8, FSMR-C.

4B. **Gypsum Board*** — (As an alternate to Items 4 through 4A) - Installed as described in Item 4. 5/8 in. thick, 4 ft. wide, paper surfaced, applied vertically and fastened to the studs with 1 in. long Type S steel screws spaced 8 in. OC.
NATIONAL GYPSUM CO — Type SBWB

5. **Batts and Blankets*** — (Optional) — Mineral wool or glass fiber batts partially or completely filling stud cavity. Any mineral wool or glass fiber batt bearing the UL Classification Marking as to Fire Resistance. See Batt and Blankets (BZJZ) Category For Names Of Classified Companies.

5A. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) — (100% Borate Formulation) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product with a nominal dry density of 2.7 lb/ft³. Alternate Application Method: The fiber is applied without water or adhesive at a nominal dry density of 3.5 lb/ft³, in accordance with the application instructions supplied with the product.
U S GREENFIBER L L C — INS735, NS745, INS750LD for use with wet or dry application. INS765LD and INS773LD are to be used for dry application only.

5B. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) and Item 5A - Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.
NU-WOOL CO INC — Cellulose Insulation

5C. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 5) - Spray applied cellulose fiber. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. The minimum dry density shall be 4.30 lbs/ft³.
INTERNATIONAL CELLULOSE CORP — Celbar-RL

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2019-10-02

Design No. U465

May 29, 2020

Nonbearing Wall Rating — 1 HR.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Floor and Ceiling Runners** — (Not Shown) — Channel shaped runners, 3-5/8 in. deep (min), 1-1/4 in. legs, formed from min No. 25 MSG galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.

1A. **Framing Members* — Floor and Ceiling Runners** — (Not Shown) — As an alternate to Item 1 — Channel shaped, min 3-5/8 in. deep, attached to floor and ceiling with fasteners 24 in. OC. max.
ALLSTEEL & GYPSUM PRODUCTS INC — Type SUPREME D24/30EQD and Type SUPREME D20

CONSOLIDATED FABRICATORS CORP, BUILDING PRODUCTS DIV — Type SUPREME D24/30EQD and Type SUPREME D20

QUAIL RUN BUILDING MATERIALS INC — Type SUPREME D24/30EQD and Type SUPREME D20

SCAFCO STEEL STUD MANUFACTURING CO — Type SUPREME D24/30EQD and Type SUPREME D20

STEEL CONSTRUCTION SYSTEMS INC — Type SUPREME D24/30EQD and Type SUPREME D20

UNITED METAL PRODUCTS INC — Type SUPREME D24/30EQD and Type SUPREME D20

1B. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Item 1 — For use with Item 2B, proprietary channel shaped runners, 1-1/4 in. wide by min 3-5/8 in. deep fabricated from min 0.020 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
CALIFORNIA EXPANDED METAL PRODUCTS CO — Viper20™ Track

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™ Track

FUSION BUILDING PRODUCTS — Viper20™ Track

IMPERIAL MANUFACTURING GROUP INC — Viper20™ Track

1C. **Floor and Ceiling Runners** — (Not Shown) — For use with Item 2C — Channel shaped, fabricated from min 20 MSG corrosion-protected or galv steel, min depth to accommodate stud size, with min 1 in. long legs, attached to floor and ceiling with fasteners spaced max 24 in. OC.

1D. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Items 1 through 1C — For use with Item 2D and 4G only, proprietary channel shaped runners, 1-1/4 in. deep by min 3-5/8 in. wide fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
CLARKDIETRICH BUILDING SYSTEMS — CD ProTRAK

DMFCWBS L L C — ProTRAK

MBA METAL FRAMING — ProTRAK

RAM SALES L L C — Ram ProTRAK

STEEL STRUCTURAL PRODUCTS L L C — Tri-S ProTRAK

1E. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Items 1 through 1D — For use with Item 2E and 4I only, proprietary channel shaped runners, 1-1/4 in. deep by min 3-5/8 in. wide fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
TELLING INDUSTRIES L L C — TRUE-TRACK™

1F. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Items 1 through 1E — For use with Item 2, channel shaped runners, 1-1/4 in. deep by min 3-5/8 in. wide fabricated from min 25 MSG steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
KIRII (HONG KONG) LTD — Type KIRII

1G. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Items 1 through 1F — For use with Item 2, channel shaped runners, 1-1/4 in. deep by min 3-5/8 in. wide, attached to floor and ceiling with fasteners spaced 24 in. OC max.
STUDCO BUILDING SYSTEMS — CROCSTUD Track

1H. **Floor and Ceiling Runners** — (Not Shown) — Channel shaped, fabricated from min 0.02 in. galv steel, min width to accommodate stud size, with min 1 in. long legs, for use with studs specified below and fabricated from min 0.02 in. galv steel or thicker, attached to floor and ceiling with fasteners spaced max 24 in. OC.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™ Track VT100

FUSION BUILDING PRODUCTS — Viper20™ Track VT100

IMPERIAL MANUFACTURING GROUP INC — Viper20™ Track VT100

1I. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Item 1 — For use with Item 2H, proprietary channel shaped runners, 1-1/4 in. wide by min 3-5/8 in. deep fabricated from min 0.020 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
TELLING INDUSTRIES L L C — Viper20™ Track

1J. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Items 1 — For use with Item 2 L, proprietary channel shaped runners, 1-1/4 in. deep by min 3-5/8 in. wide fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
RESCUE METAL FRAMING, L L C — AlphaTRAK

1K. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Item 1 — For use with Item 2M, proprietary channel shaped runners, 1-1/4 in. wide by min 3-5/8 in. deep, fabricated from min 25 MSG (0.018 in. min. bare metal thickness), attached to floor and ceiling with fasteners spaced 24 in. OC max.
CALIFORNIA EXPANDED METAL PRODUCTS CO — Viper X Track

1L. **Framing Members* — Floor and Ceiling Runners** — Not Shown — In lieu of Item 1 — For use with Item 2N, proprietary channel shaped runners, 1-1/4 in. wide by min 3-5/8 in. deep fabricated from min 0.020 in. thick galv steel, attached to floor and ceiling with fasteners spaced 24 in. OC max.
CRACO MFG INC — SmartTrack20™

2. **Steel Studs** — Channel shaped, 3-5/8 in. deep (min), formed from min No. 25 MSG galv steel spaced 24 in. OC max. Studs to be cut 3/4 in. less than assembly height.

2A. **Framing Members* — Steel Studs** — As an alternate to Item 2 — Channel shaped studs, min 3-5/8 in. deep, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.
ALLSTEEL & GYPSUM PRODUCTS INC — Type SUPREME D24/30EQD and Type SUPREME D20

CONSOLIDATED FABRICATORS CORP, BUILDING PRODUCTS DIV — Type SUPREME D24/30EQD and Type SUPREME D20

QUAIL RUN BUILDING MATERIALS INC — Type SUPREME D24/30EQD and Type SUPREME D20

SCAFCO STEEL STUD MANUFACTURING CO — Type SUPREME D24/30EQD and Type SUPREME D20

STEEL CONSTRUCTION SYSTEMS INC — Type SUPREME D24/30EQD and Type SUPREME D20

UNITED METAL PRODUCTS INC — Type SUPREME D24/30EQD and Type SUPREME D20

2B. **Framing Members* — Steel Studs** — Not Shown — In lieu of Item 2 — For use with Item 1B, proprietary channel shaped steel studs, 1-1/4 in. wide by min 3-5/8 in. deep fabricated from min 0.020 in. thick galv steel. Studs cut 3/4 in. less in length than assembly height.
CALIFORNIA EXPANDED METAL PRODUCTS CO — Viper20™

CRACO MFG INC — SmartStud20™

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™

FUSION BUILDING PRODUCTS — Viper20™

IMPERIAL MANUFACTURING GROUP INC — Viper20™

2C. **Steel Studs** — (As an alternate to Item 2, For use with Item 1C) — Channel shaped, fabricated from min 20 MSG corrosion-protected or galv steel, 3-1/2 in. min depth, spaced a max of 16 in. OC. Studs friction-fit into floor and ceiling runners. Studs to be cut 5/8 to 3/4 in. less than assembly height. See materials in Item(s) 4 that require Item 2C studs.

2D. **Framing Members* — Steel Studs** — As an alternate to Items 2 through 2C — For use with Item 1D and 4G only, channel shaped studs, min 3-5/8 in. wide fabricated from min 0.018 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 1/2 in. less than assembly height.
CLARKDIETRICH BUILDING SYSTEMS — CD ProSTUD

DMFCWBS L L C — ProSTUD

MBA METAL FRAMING — ProSTUD

RAM SALES L L C — Ram ProSTUD

STEEL STRUCTURAL PRODUCTS L L C — Tri-S ProSTUD

2E. **Framing Members* — Steel Studs** — As an alternate to Items 2 through 2D — For use with Item 1E and 4I only, channel shaped studs, min 3-5/8 in. wide fabricated from min 0.018 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 1/2 in. less than assembly height.
TELLING INDUSTRIES L L C — TRUE-STUD™

2F. **Framing Members* — Steel Studs** — As an alternate to Items 2 through 2E — For use with Item 1F, channel shaped studs, min 3-5/8 in. wide fabricated from min 25 MSG steel, spaced a max of 24 in. OC. Studs to be cut 1/2 in. less than assembly height.
KIRII (HONG KONG) LTD — Type KIRII

2G. **Framing Members* — Steel Studs** — Not Shown — In lieu of Item 2 through 2F — For use with Item 1G. Proprietary channel shaped studs, minimum 3-5/8 in. wide, Studs to be cut 1/2 in. less than the assembly height.
STUDCO BUILDING SYSTEMS — CROCSTUD

2H. **Framing Members* — Steel Studs** — Not Shown — In lieu of Item 2 — For use with Item 1I, proprietary channel shaped steel studs, 1-1/4 in. wide by min 3-5/8 in. deep fabricated from min 0.020 in. thick galv steel. Studs cut 3/4 in. less in length than assembly height.
TELLING INDUSTRIES L L C — Viper20™

2I. **Framing Members* — Steel Studs** — In lieu of Item 2 — For use with Item 1, channel shaped studs, fabricated from min 25 MSG corrosion-protected steel, 3-5/8 in. deep (min), spaced 24 in. OC max. Studs to be cut 3/4 in. less than assembly height.
EB METAL INC — NITROSTUD

2J. **Framing Members* — Steel Studs** — In lieu of Item 2 — For use with Item 1, channel shaped studs, fabricated from min 25 MSG corrosion-protected steel, 3-5/8 in. deep (min), spaced 24 in. OC max. Studs to be cut 3/4 in. less than assembly height.
OLMAR SUPPLY INC — PRIMESTUD

2K. **Framing Members* — Steel Studs** — As an alternate to Item 2 — For use with Item 1B (3-5/8 in. wide track), channel shaped studs, fabricated from min 25 MSG corrosion-protected steel, 1-1/4 in. wide by 3-5/8 in. deep, spaced a max of 24 in. OC. Studs to be cut 3/8 to 3/4 in. less than assembly height.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — StudRite™

2L. **Framing Members* — Steel Studs** — As an alternate to Items 2 — For use with Item 1J, channel shaped studs, min 3-5/8 in. wide fabricated from min 0.018 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.
RESCUE METAL FRAMING, L L C — AlphaSTUD

2M. **Framing Members* — Steel Studs** — Not Shown — In lieu of Item 2 — For use with Item 1K, proprietary channel shaped steel studs, min 1-1/4 in. wide by min 3-5/8 in. deep, fabricated from min 25 MSG (0.018 in. min. bare metal thickness). Studs cut 3/4 in. less in length than assembly height.
CALIFORNIA EXPANDED METAL PRODUCTS CO — Viper X

2N. **Framing Members* — Steel Studs** — Not Shown — In lieu of Item 2 — For use with Item 1L, proprietary channel shaped steel studs, 1-1/4 in. wide by min 3-5/8 in. deep fabricated from min 0.020 in. thick galv steel. Studs cut 3/4 in. less in length than assembly height.
CRACO MFG INC — SmartStud20™

3. **Batts and Blankets*** — (Optional) — Mineral wool or glass fiber batts partially or completely filling stud cavity.
See **Batts and Blankets** (BZJZ) category for names of Classified companies.

ROCKWOOL — Type AFB, min. density 1.69 pcf / 27.0 kg/m³

ROCKWOOL MALAYSIA SDN BHD — Type Acoustical Fire Batts

3A. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 3) — (100% Borate Formulation) — Spray applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product with a nominal dry density of 2.7 lb/ft³. Alternate Application Method: The fiber is applied without water or adhesive at a nominal dry density of 3.5 lb/ft³, in accordance with the application instructions supplied with the product.
U S GREENFIBER L L C — INS735, INS745, INS750LD for use with wet or dry application. INS765LD and INS773LD are to be used for dry application only

3B. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 3) — Spray applied cellulose insulation material. The fiber is applied with water to interior surfaces in accordance with the application instructions supplied with the product. Applied to completely fill the enclosed cavity. Minimum dry density of 4.3 pounds per cubic ft.
NU-WOOL CO INC — Cellulose Insulation

3C. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 3) — Spray applied cellulose fiber. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. The minimum dry density shall be 4.30 lbs/ft³.
INTERNATIONAL CELLULOSE CORP — Celbar-RL

3D. **Batts and Blankets*** — For use with Item 8. Nom 3 in. thick, minimum 3.4 pcf mineral wool batts, friction fit between the studs and floor and ceiling runners.
See **Batts and Blankets** (BZJZ) category for names of manufacturers.

3E. **Batts and Blankets*** — For use with Item 4P, 4R, and 4S. Placed in stud cavities, any min. 3-1/2 in. thick glass fiber insulation bearing the UL Classification Marking as to Surface Burning Characteristics and/or Fire Resistance.
See **Batts and Blankets** (BKNV or BZJZ) Categories for names of Classified companies.

3F. **Fiber, Sprayed*** — As an alternate to Batts and Blankets (Item 3) — Spray-applied cellulose material. The fiber is applied with water to completely fill the enclosed cavity in accordance with the application instructions supplied with the product. To facilitate the installation of the material, any thin, woven or non-woven netting may be attached by any means possible to the outer face the studs. The material shall reach equilibrium moisture content before the installation of materials on either face of the studs. The minimum dry density shall be 5.79 lbs/ft³.
APPLEGATE HOLDINGS L L C — Applegate Advanced Stabilized Cellulose Insulation

4. **Gypsum Board*** — 5/8 in. thick, 4 ft wide, attached to steel studs and floor and ceiling track with 1 in. long, Type S steel screws spaced 8 in. OC. along edges of board and 12 in. OC in the field of the board. Joints oriented vertically and staggered on opposite sides of the assembly. When attached to Items 6 (resilient channels) or 6A, 6B, 6C, 6D, or 6E (furring channels), gypsum board is screw attached to furring channels with 1 in. long, Type S steel screws spaced 12 in. OC.
AMERICAN GYPSUM CO — Types AG-C, AGX-1, M-Glass, LightRoc

BEIJING NEW BUILDING MATERIALS PUBLIC LTD CO — Type DBX-1

CABOT MANUFACTURING ULC — Type X, 5/8 Type X, Type Blueglass Exterior Sheathing

CGC INC — Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, USGX, WRC or WRX (Joint tape and compound, Item 5, optional for use with Type USGX)

CERTAINTEED GYPSUM INC — Types EGRG, GlasRoc, Type X, Type X-1, Type C, 5/8" Easi-Lite Type X, Easi-Lite Type X-2

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Types LGFC2A, LGFC6A, LGFC-C/A, LGFC-WD, LGLLX

GEORGIA-PACIFIC GYPSUM L L C — Types 5, 6, 9, C, DAP, DD, DA, DAPC, DGG, DS, GPFS6, LS, Type X, Veneer Plaster Base - Type X, Water Rated - Type X, Sheathing - Type X, Soffit - Type X, TG-C, GreenGlass Type X, Type X ComfortGuard Sound Deadening Gypsum Board, Type LWX, Veneer Plaster Base-Type LWX, Water Rated-Type LWX, Sheathing Type-LWX, Soffit-Type LWX, Type DGLW, Water Rated-Type DGLW, Sheathing Type- DGLW, Soffit-Type DGLW, Type LW2X, Veneer Plaster Base - Type LW2X, Water Rated - Type LW2X, Sheathing - Type LW2X, Soffit - Type LW2X, Type DGL2W, Water Rated - Type DGL2W, Sheathing – Type DGL2W

NATIONAL GYPSUM CO — Types eXP-C, FSK, FSK-C, FSK-G, FSMR-C, FSW-C, FSW-G, FSW, FSW-3, FSW-5, FSW-6, FSW-8, FSL

NATIONAL GYPSUM CO — Riyadh, Saudi Arabia — Type FR, or WR

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Types PG-C, PG-9, PG-11, PGS-WRS

PANEL REY S A — Types GREX, GRIX, PRC, PRC2, PRX, RHX, MDX, ETX

SAINT-GOBAIN GYPROC MIDDLE EAST FZE — Type Gyproc FireStop, Gyproc FireStop MR, Gyproc FireStop M2TECH, Gyproc FireStop ACTIV'Air, Gyproc FireStop MR ACTIV'Air, Gyproc FireStop M2TECH ACTIV'Air, Gyproc DuraLine, Gyproc DuraLine MR, Gyproc DuraLine M2TECH, Gyproc DuraLine ACTIV'Air, Gyproc DuraLine MR ACTIV'Air, Gyproc DuraLine M2TECH ACTIV'Air

SIAM GYPSUM INDUSTRY (SARABURI) CO LTD — Type EX-1

THAI GYPSUM PRODUCTS PCL — Type X, Type C

UNITED STATES GYPSUM CO — Type AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX, USGX (Joint tape and compound, Item 5, optional for use with Type USGX)

USG BORAL DRYWALL SFZ LLC — Types C, SCX, USGX (Joint tape and compound, Item 5, optional for use with Type USGX)

USG MEXICO S A DE C V — Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, USGX, WRC or WRX (Joint tape and compound, Item 5, optional for use with Type USGX)

4A. **Gypsum Board*** — (As alternate to Item 4) — Nom 5/8 in. thick gypsum panels with beveled, square or tapered edges, applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered or backed by steel framing. Panels attached to steel studs and floor runner with 1 in. long Type S steel screws spaced 8 in. OC when applied horizontally, or 8 in. OC along vertical and bottom edges and 12 in. OC in the field when panels are applied vertically. When used in widths other than 48 in., gypsum panels to be installed horizontally.
CERTAINTEED GYPSUM INC — Type X, Type X-1, Type C, Type EGRG/ GlasRoc, GlasRoc-2, Type SilentFX, Easi-Lite Type X-2

CGC INC — Types AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, USGX, WRC or WRX (Joint tape and compound, Item 5, optional for use with Type USGX)

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Types LGFC2A, LGFC6A, LGFC-C/A, LGFC-WD

GEORGIA-PACIFIC GYPSUM L L C — Types DAP, DAPC, DGG, DS

SAINT-GOBAIN GYPROC MIDDLE EAST FZE — Type Gyproc FireStop, Gyproc FireStop MR, Gyproc FireStop M2TECH, Gyproc FireStop ACTIV'Air, Gyproc FireStop MR ACTIV'Air, Gyproc FireStop M2TECH ACTIV'Air, Gyproc DuraLine, Gyproc DuraLine MR, Gyproc DuraLine M2TECH, Gyproc DuraLine ACTIV'Air, Gyproc DuraLine MR ACTIV'Air, Gyproc DuraLine M2TECH ACTIV'Air

THAI GYPSUM PRODUCTS PCL — Type X, Type C

UNITED STATES GYPSUM CO — Types AR, C, FRX-G, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRC, WRX, USGX (Joint tape and compound, Item 5, optional for use with Type USGX)

USG BORAL DRYWALL SFZ LLC — Types C, SCX, USGX (Joint tape and compound, Item 5, optional for use with Type USGX)

USG MEXICO S A DE C V — Type AR, C, IP-AR, IP-X1, IP-X2, IPC-AR, SCX, SHX, USGX, WRC or WRX (Joint tape and compound, Item 5, optional for use with Type USGX)

4B. **Gypsum Board*** — (As an alternate to Items 4 or 4A) — Nom 3/4 in. thick, 4 ft wide, installed as described in Item 4A with screw length increased to 1-1/4 in.
CGC INC — Types AR, IP-AR

UNITED STATES GYPSUM CO — Types AR, IP-AR

USG MEXICO S A DE C V — Types AR, IP-AR

4C. **Gypsum Board*** — As an alternate to Items 4, 4A, and 4B — Nom. 5/8 in. thick gypsum panels, with square edges, applied horizontally. Gypsum panels fastened to framing with 1 in. long bugle head steel screws spaced a max 8 in. OC, with last 2 screws 3/4 in. and 4 in. from each edge of board. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal butt joints on opposite sides of studs on interior walls need not be staggered or backed by steel framing.
GEORGIA-PACIFIC GYPSUM L L C — Type DGG, GreenGlass Type X

4D. **Gypsum Board*** — As an alternate to Items 4, 4A, 4B, and 4C — Nom. 5/8 in. thick gypsum panels applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered or backed by steel framing. Gypsum panels fastened to framing with 1 in. long Type S steel screws 12 in. OC along vertical edges and in the field. Screws spaced a max 12 in. along the top and bottom edges of the wall for both vertical and horizontal applications. When used in widths other than 48 in., gypsum panels to be installed horizontally.
NATIONAL GYPSUM CO — Types eXP-C, FSK, FSK-C, FSK-G, FSL, FSW-C, FSW-G, FSW, FSW-3, FSW-5, FSW-6, FSMR-C

4E. **Gypsum Board*** — (As an alternate to Items 4 through 4D) — Installed as described in Item 4. 5/8 in. thick, 4 ft. wide, applied vertically only and fastened to the studs and plates with 1 in. long, Type S steel screws spaced, 12 in. OC.
NATIONAL GYPSUM CO — Type SBWB

4F. **Gypsum Board*** — (Not Shown) — (As an alternate to Item 4 when used as the base layer on one or both sides of wall. For direct attachment only to steel studs Item 2C) — Nom 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Gypsum board secured to studs with 1-1/4 in. long Type S-12 steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field.
RAY-BAR ENGINEERING CORP — Type RB-LBG

4G. **Gypsum Board*** — (As an alternate to Items 4 through 4F) — For use with Items 1D and 2D only, 5/8 in. thick, 4 ft wide, attached to steel studs and floor and ceiling track with 1 in. long, Type S steel screws spaced 8 in. OC. along edges of board and 12 in. OC in the field of the board. Joints oriented vertically and staggered on opposite sides of the assembly.
CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Type LGFC6A, LGFC-C/A

NATIONAL GYPSUM CO — Types FSW

UNITED STATES GYPSUM CO — Type SCX

USG BORAL DRYWALL SFZ LLC — Type SCX

4H. **Gypsum Board*** — (As an alternate to Items 4 through 4G) — Nominal 5/8 in. thick, 4 ft wide panels, applied vertically and secured as described in Item 4.
PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type QuietRock ES

4I. **Gypsum Board*** — (As an alternate to Items 4 through 4F) — For use with Items 1E and 2E only, 5/8 in. thick, 4 ft wide, attached to steel studs and floor and ceiling track with 1 in. long, Type S steel screws spaced 8 in. OC. along edges of board and 12 in. OC in the field of the board. Joints oriented vertically and staggered on opposite sides of the assembly.
UNITED STATES GYPSUM CO — Type SCX

USG BORAL DRYWALL SFZ LLC — Type SCX

4J. **Gypsum Board*** — (Not Shown) — (As an alternate to Item 4 when used as the base layer on one or both sides of wall. For direct attachment only to steel studs Item 2C) — Nom 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Gypsum board secured to studs with 1-1/4 in. long Type S-12 steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field. To be used with Lead Batten Strips (see Item 9A) or Lead Discs (see Item 10A).
MAYCO INDUSTRIES INC — Type X-Ray Shielded Gypsum

4K. **Gypsum Board*** — (As an alternate to Item 4 and 4A, not for use with Items 1D, 1E, 2D and 2E) — Nom. 5/8 in. thick gypsum panels with beveled, square or tapered edges installed as described in Item 4 and 4A.
CGC INC — Type ULX

UNITED STATES GYPSUM CO — Type ULX

USG MEXICO S A DE C V — Type ULX

4L. **Gypsum Board*** — (Not Shown) — (As an alternate to Item 4 when used as the base layer on one or both sides of wall. For direct attachment only to steel studs Item 2C). Nom 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Wallboard secured to studs with 1-1/4 in. long Type S-12 steel screws gypsum panel steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field. Lead batten strips required behind vertical joints of lead backed gypsum wallboard and optional at remaining stud locations. Lead batten strips, min 2 in. wide, max 8 ft long with a max thickness of 0.14 in. placed on the face of studs and attached to the stud with construction adhesive and two 1 in. long Type S-12 pan head steel screws, one at the top of the strip and one at the bottom of the strip. Lead discs, nominal 3/8 in. diam by max 0.085 in. thick. Compression fitted or adhered over the screw heads. Lead batten strips and discs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C".
RADIATION PROTECTION PRODUCTS INC — Type RPP - Lead Lined Drywall

4M. **Gypsum Board*** — (For use with Item 8) — 5/8 in. thick, 4 ft wide, applied vertically over Mineral and Fiber Board (Item 8) with vertical joints located anywhere over stud cavities. Secured to mineral and fiber boards with 1-1/2 in. Type G Screws spaced 8 in. OC along edges of each vertical joint and 12 in. OC in intermediate field of the Mineral and Fiber Board (Item 8). Secured to outermost studs and floor and ceiling runners with 2 in. long Type S screws spaced 8 in. OC. Gypsum Board joints covered with paper tape and joint compound. Screw heads covered with joint compound.
AMERICAN GYPSUM CO — Type AG-C

CERTAINTEED GYPSUM INC — Type C

CGC INC — Types C, IP-X2, IPC-AR

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Type LGFC-C/A

GEORGIA-PACIFIC GYPSUM L L C — Types 5, DAPC, TG-C

NATIONAL GYPSUM CO — Types eXP-C, FSK-C, FSW-C

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type PG-C

PANEL REY S A — Types PRC, PRC2

SAINT-GOBAIN GYPROC MIDDLE EAST FZE — Type Gyproc FireStop, Gyproc FireStop MR, Gyproc FireStop M2TECH, Gyproc FireStop ACTIV'Air, Gyproc FireStop MR ACTIV'Air, Gyproc FireStop M2TECH ACTIV'Air, Gyproc DuraLine, Gyproc DuraLine MR, Gyproc DuraLine M2TECH, Gyproc DuraLine ACTIV'Air, Gyproc DuraLine MR ACTIV'Air, Gyproc DuraLine M2TECH ACTIV'Air

THAI GYPSUM PRODUCTS PCL — Type C

UNITED STATES GYPSUM CO — Types C, IP-X2, IPC-AR

USG BORAL DRYWALL SFZ LLC — Type C

USG MEXICO S A DE C V — Types C, IP-X2, IPC-AR

4N. **Wall and Partition Facings and Accessories*** — (As an alternate to Item 4) — Nominal 5/8 in. thick, 4 ft wide panels, applied vertically and secured as described in Item 4.
PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type QuietRock 527

4O. **Gypsum Board*** — As an alternate to Items 4, 4A, 4B, and 4C — Two layers Nom. 5/16 in. thick gypsum panels applied vertically or horizontally. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered or backed by steel framing. Horizontal joints on the same side need not be staggered. When applied horizontally, both layers of gypsum board fastened to each side of framing with 1 in. long Type S steel screws spaced 8 in. OC and staggered 4 in. OC between layers. When applied vertically, both layers of gypsum board fastened to each side of framing with 1 in. long Type S steel screws spaced 8 in. OC along vertical edges and 12 in. OC in the field, staggered 4 in. OC between layers. Screws spaced a max 12 in. along the top and bottom edges of the wall.
NATIONAL GYPSUM CO — Type FSW

4P. **Gypsum Board*** — As an alternate to Item 4. For use with Item 3E, **Batts and Blankets*** — 5/8 in. thick, 4 ft wide, installed as described in Item 4.
UNITED STATES GYPSUM CO — Types ULIX

4Q. **Gypsum Board*** — 3/4 in. thick, 4 ft wide, attached to steel studs and floor and ceiling track as described in Item 4 with screw length increased to min. 1- 1/8 in.
PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type PG-13

4R. **Gypsum Board*** — As an alternate to Item 4D. For use with Item 3E, **Batts and Blankets*** — 5/8 in. thick, 4 ft wide, installed as described in Item 4.
NATIONAL GYPSUM CO — Type FSLX.

4S. **Gypsum Board*** — As an alternate to Item 4. For use with Item 3E, **Batts and Blankets*** — 5/8 in. thick, 4 ft wide, installed as described in Item 4A.
CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Type CLLX.

4T. **Wall and Partition Facings and Accessories*** — (As an alternate to 5/8 in. thick board as outlined in Item 4) — Nominal 1-3/8 in. thick, 4 ft wide panels, applied vertically or horizontally. Fastened with #6 x 2 in. long drywall screws spaced 8 in. OC along the perimeter and 12 in. OC in the field.
PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type QuietRock 545

5. **Joint Tape and Compound** — Vinyl, dry or premixed joint compound, applied in two coats to joints and screw heads; paper tape, 2 in. wide, embedded in first layer of compound over all joints. As an alternate, nominal 3/32 in. thick gypsum veneer plaster may be applied to the entire surface of Classified veneer baseboard. Joints reinforced. Paper tape and joint compound may be omitted when gypsum boards are supplied with square edges.

6. **Resilient Channel** — (Optional — Not Shown) — 25 MSG galv steel resilient channels spaced vertically max 24 in. OC, flange portion attached to each intersecting stud with 1/2 in. long type S-12 pan head steel screws. May not be used with Item 4F, 4J or 4L.

6A. **Steel Framing Members*** — (Not Shown) — As an alternate to Item 6, furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel, 2-9/16 in. or 2-23/32 in. wide by 7/8 in. deep, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels are overlapped 6 in. and tied together with double strand of No. 18 SWG galv steel wire near each end of overlap. As an alternate, ends of adjoining channels may be overlapped 6 in. and secured together with two self-tapping No. 6 framing screws, min 7/16 in. long at the midpoint of the overlap, with one screw on each flange of the channel. Not for use with Items 4F, 4J, or 4L.

b. **Framing Members*** — Used to attach furring channels (Item a) to studs (Item 2). Clips spaced 48 in. OC., and secured to studs with 1-5/8 in. wafer or hex head Type S steel screw through the center grommet. Furring channels are friction fitted into clips. RSIC-1 clip for use with 2-9/16 in. wide furring channels. RSIC-1 (2.75) clip for use with 2-23/32 in. wide furring channels.
PAC INTERNATIONAL L L C — Types RSIC-1, RSIC-1 (2.75)

6B. **Framing Members*** — (Not Shown) — (Optional on one or both sides) — As an alternate to Item 6, furring channel and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel, 2-3/8 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Gypsum board attached to furring channels as described in Item 4. Not for use with Items 4F, 4J, or 4L.

b. **Steel Framing Members*** — Used to attach furring channels (Item 6Ba) to studs (Item 2). Clips spaced max. 48 in. OC. GENIECLIPS secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. Furring channels are friction fitted into clips.
PLITEQ INC — Type Genie Clip

6C. **Steel Framing Members*** — (Optional, Not Shown) — Furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel. Spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel wire.Gypsum board attached to furring channels as described in Item 4. Not for use with Items 4F, 4J, or 4L.

b. **Steel Framing Members*** — Used to attach furring channels (Item 6Ca) to studs. Clips spaced 48 in. OC., and secured to studs with 2 in. coarse drywall screw with 1 in. diam washer through the center hole. Furring channels are friction fitted into clips.
STUDCO BUILDING SYSTEMS — RESILMOUNT Sound Isolation Clips - Type A237R

6D. **Steel Framing Members*** — (Optional, Not Shown) — Furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel. Spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item 6Db. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel wire. Gypsum board attached to furring channels as described in Item 4. Not for use with Items 4F, 4J, or 4L.

b. **Steel Framing Members*** — UUsed to attach furring channels (Item 6Da) to studs. Clips spaced 48 in. OC, and secured to studs with No.8 x 2-1/2 in. coarse drywall screw through the center hole. Furring channels are friction fitted into clips.
REGUPOL AMERICA — Type SonusClip

6E. **Steel Framing Members*** — (Optional, Not Shown) — Resilient channels and Steel Framing Members as described below:

a. **Resilient Channels** — Formed of No. 25 MSG galv steel, spaced 24 in. OC, and perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and secured in place with two No. 8 15 x 1/2 in. Philips Modified Truss screws spaced 2-1/2 in. from the center of the overlap. Gypsum board attached to resilient channels as described in Item 4. Not for use with Items 4F, 4J, or 4L.

b. **Steel Framing Members*** — Used to attach resilient channels (Item 6Ea) to studs. Clips spaced 48 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Resilient channels are secured to clips with one No. 10 x 1/2 in. pan-head self-drilling screw.
KEENE BUILDING PRODUCTS CO INC — Type RC+ Assurance Clip

7. **Wall and Partition Facings and Accessories*** — (Optional, Not Shown) — Nominal 1/2 in. thick, 4 ft wide panels, for optional use as an additional layer on one or both sides of the assembly. Panels attached in accordance with manufacturer's recommendations. When the QR-500 or QR-510 panel is installed between the steel framing and the UL Classified gypsum board, the required UL Classified gypsum board layer(s) is/are to be installed as indicated as to fastener type and spacing, except that the required fastener length shall be increased by a minimum of 1/2 in. Not evaluated or intended as a substitute for the required layer(s) of UL Classified Gypsum Board.
PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type QuietRock QR-500 and QR-510

8. **Mineral and Fiber Board*** — (Optional, Not Shown) — For optional use as an additional layer on one side of wall. Nom 1/2 in. thick, 4 ft wide with long dimension parallel and centered over studs. Attached to studs and floor and ceiling runners with 1-5/8 in. long Type S steel screws, spaced 12 in. OC and 24 in. OC along all intermediate framing. The required UL Classified gypsum board layer (Item 4M) is to be installed over the Mineral and Fiber Boards. Batts and Blankets, Item 3D, and Adhesive, Item 11, are required.
HOMASOTE CO — Homasote Type 440-32

8A. **Mineral and Fiber Board** — (Optional, Not Shown) — For optional use as an additional layer on one side of wall - Nom 1/2 in. thick, 4 ft wide, square edge fiber boards applied vertically to studs on one side of the wall in between the wood studs and the UL Classified Gypsum Board (Item 4). Fiber boards installed with 1-1/4 in. long, Type S steel screws spaced 12 in. OC max, with the last screws spaced 2 in. and 6 in. from edge of board. Gypsum board (Item 4) installed as indicated as to fastener type and spacing, except that the required fastener length shall be increased by a minimum of 1/2 in. Not evaluated or intended as a substitute for the required layer(s) of UL Classified Gypsum Board. Not evaluated for use with Item 4M.
BLUE RIDGE FIBERBOARD INC — SoundStop

8B. **Mineral and Fiber Board*** — (Optional, Not Shown) — For optional use as an additional layer on one side of wall. Nom 1/2 in. thick, 4 ft wide with long dimension parallel and centered over studs. Attached to studs and floor and ceiling runners with 1-5/8 in. long Type S steel screws, spaced 12 in. OC and 24 in. OC along all intermediate framing. The required UL Classified gypsum board layer is to be installed over the Mineral and Fiber Boards and secured to studs with length of fasteners increased by 1/2 in. over the length specified for installation of the gypsum boards. Batts and Blankets, Item 3, are optional unless otherwise required. Not for use with Items 4F, 4J, 4L, and 4M.
HOMASOTE CO — Homasote Type 440-32

9. **Lead Batten Strips** — (Not Shown, For Use With Item 4E) — Lead batten strips, min 1-1/2 in. wide, max 10 ft long with a max thickness of 0.125 in. Strips placed on the interior face of studs and attached from the exterior face of the stud with two 1 in. long Type S-12 pan head steel screws, one at the top of the strip and one at the bottom of the strip. Lead batten strips to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C". Lead batten strips required behind vertical joints of lead backed gypsum board (Item 4E) and optional at remaining stud locations. Required behind vertical joints.

9A. **Lead Batten Strips** — (Not Shown, for use with Item 4J) — Lead batten strips, 2 in. wide, max 10 ft long with a max thickness of 0.140 in. Strips placed on the face of studs and attached to the stud with two min. 1 in. long min. Type S-8 pan head steel screws, one at the top of the strip and one at the bottom of the strip or with one min. 1 in. long min. Type S-8 pan head steel screw at the top of the strip. Lead batten strips to have a purity of 99.5% meeting the Federal specification QQ-L-201f, Grades "B, C or D". Lead batten strips required behind vertical joints of lead backed gypsum wallboard (Item 4J) and optional at remaining stud locations.

10. **Lead Discs or Tabs** — (Not Shown, For Use With Item 4E) — Used in lieu of or in addition to the lead batten strips (Item 8) or optional at other locations - Max 3/4 in. diam by max 0.125 in. thick lead discs compression fitted or adhered over steel screw heads or max 1/2 in. by 1-1/4 in. by max 0.125 in. thick lead tabs placed on gypsum boards (Item 4E) underneath screw locations prior to the installation of the screws. Lead discs or tabs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C".

10A. **Lead Discs** — (Not Shown, for use with Item 4J) — Max 5/16 in. diam by max 0.140 in. thick lead discs compression fitted or adhered over steel screw heads. Lead discs to have a purity of 99.5% meeting the Federal Specification QQ-L-201f, Grades "B, C or D".

11. **Adhesive** — Not Shown — (For use with Item 8) — Construction grade adhesive applied in vertical, serpentine, nominal 3/8 in. wide beads down the length of both vertical edges of Mineral and Fiber Board (Item 8).

12. **Wall and Partition Facings and Accessories*** — (Optional, Not Shown) — For use with Items 1 to 1I, Items 2 to 2J, Item 3, Items 4 to 4I, Item 5 and Item 6. For maximum fire rating of 1 hour. On one side of the wall, over the first layer of Gypsum Board (Item 4 to Item 4I), install RefleXor membrane with the gold side facing outwards. Membrane installed with T50 staples spaced 12 inches on center in both directions as per manufacturer's instructions, seams in membrane to be overlapped by 2 inches. When RefleXor membrane is used an additional layer of Gypsum Board that is identical to the one used in the first layer and as specified in Item 4 to Item 4I shall be installed over the membrane. The additional layer of Gypsum Board to be installed through the membrane to the stud as specified in Item 4 to Item 4I except the fastener length shall be increased by a minimum of 5/8 inch. Install Batts and Blankets in the stud cavity as per Item 3. On the other side of the wall, prior to the installation of the Gypsum Board, install Resilient Channels as per Item 6. Over the Resilient Channels install 3/4 inch thick SONOpan panel secured to the Resilient Channels with drywall screws and washers spaced at 16 in. OC on the perimeter of the panel and 8 in. OC in the field of the panel. Over the SONOpan panel install the same Gypsum Board as specified in Item 4 to Item 4I with the fastener length increased by minimum 3/4 inch. Not evaluated or intended as a substitute for the required layer(s) of UL Classified Gypsum Board.
MSL — RefleXor membrane, SONOpan panel

13. **Barrier Mesh** — (Optional, Not Shown) - Attached to steel studs on one or both sides of the wall using Barrier Mesh Clips spaced at maximum 12 inches on center vertically, using a flat head type screw penetrating through the steel at least 3/8 of an inch. For Steel Studs less than 0.033 inches in thickness, use self-piercing screws. For Steel Studs equal to or greater than 0.033 inches in thickness, use steel drill screws (self-tapping). Gypsum Board (Item 4) to be installed directly over the Barrier Mesh using prescribed screw patterns with lengths increased by a minimum 1/8 in. Barrier Mesh may be installed with the long dimension of the diamond pattern positioned vertically or horizontally. Barrier Mesh joints may occur as butt joints at the framing members and secured using the Barrier Mesh Clips or occur in between framing members as overlapping joints secured using 18 SWG wire ties spaced a maximum 12 in. on center.
CLARKDIETRICH BUILDING SYSTEMS — Barrier Mesh, Barrier Mesh Clips

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2020-05-29

Design No. V488

June 03, 2020

Nonbearing Wall Rating — 1 or 2 Hr. (See Items 5 and 5A)

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Floor and Ceiling Runners** — (For use with Item 5) — Channel shaped, attached to floor and ceiling in two rows, a min 1 in. apart, with steel fasteners spaced 24 in. OC. Runners fabricated from min No. 25 MSG galv steel, 1-1/4 in. wide and min 2-1/2 in. deep.

1A. **Floor and Ceiling Runners** — (As an alternate to Item 1, For use with Item 5A, 5B, and 5C) — Channel shaped, attached to floor and ceiling in two rows, a min 1 in. apart. Runners fabricated from min No. 20 MSG galv steel, 1-3/16 in. wide and min 2-9/16 in. deep.

1B. **Framing Members* — Floor and Ceiling Runners** — (Not Shown) — As an alternate to Item 1 - For use with Item 2B, channel shaped, min 2-1/2 in. deep fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners 24 in. OC. max.
CLARKDIETRICH BUILDING SYSTEMS — CD ProTRAK

DMFCWBS L L C — ProTRAK

MBA METAL FRAMING — ProTRAK

RAM SALES L L C — Ram ProTRAK

STEEL STRUCTURAL PRODUCTS L L C — Tri-S ProTRAK

1C. **Framing Members* — Floor and Ceiling Runners** — (Not Shown) — As an alternate to Item 1 - For use with Item 2C, channel shaped, min 2-1/2 in. deep fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners 24 in. OC. max.
TELLING INDUSTRIES L L C — TRUE-TRACK™

1D. **Framing Members* — Floor and Ceiling Runners** — (Not Shown) — As an alternate to Item 1 - For use with Item 2D, channel shaped, min 2-1/2 in. deep, attached to floor and ceiling with fasteners 24 in. OC. max.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™ Track

FUSION BUILDING PRODUCTS — Viper20™ Track

IMPERIAL MANUFACTURING GROUP INC — Viper20™ Track

1E. **Framing Members* — Floor and Ceiling Runners** — (Not Shown) — As an alternate to Item 1 for a 2 hour rating only - For use with Item 2E, channel shaped, min 2-1/2 in. deep, attached to floor and ceiling with fasteners 24 in. OC. max.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper25™ Track

FUSION BUILDING PRODUCTS — Viper25™ Track

IMPERIAL MANUFACTURING GROUP INC — Viper25™ Track

1F. **Framing Members* — Floor and Ceiling Runners** — (Not Shown) — As an alternate to Item 1 - For use with Item 2F, channel shaped, min 3-1/2 in. deep fabricated from min 0.018 in. thick galv steel, attached to floor and ceiling with fasteners 24 in. OC. max.
RESCUE METAL FRAMING, L L C — AlphaTRAK

2. **Steel Studs** — (For use with Item 5) — Channel shaped, supplied with cutouts, friction -fitted into floor and ceiling runners and spaced a max 24 in. OC. Studs cut 1/2 in. less than assembly height and evenly staggered between the two rows of floor and ceiling runners. Studs fabricated from min No. 25 MSG galv steel, min 2-1/2 in. deep by 1-5/8 in. wide with 3/8 in. folded back return flange legs.

2A. **Steel Studs** — (As an alternate to Item 2, For use with Items 5A, 5B, and 5C) — Channel shaped, supplied with cutouts, friction -fitted into floor and ceiling runners and spaced a max 16 in. OC. Studs cut 1/2 in. less than assembly height and staggered flush against the floor runners. Studs fabricated from min No. 20 MSG galv steel, min 2-1/2 in. deep by 1-3/16 in. wide with 1/4 in. folded back return flange legs.

2B. **Framing Members* — Steel Studs** — As an alternate to Item 2 — For use with Item 1B, channel shaped studs, min 2-1/2 in. deep fabricated from min 0.018 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 1/2 in. less than assembly height.
CLARKDIETRICH BUILDING SYSTEMS — CD ProSTUD

DMFCWBS L L C — ProSTUD

MBA METAL FRAMING — ProSTUD

RAM SALES L L C — Ram ProSTUD

STEEL STRUCTURAL PRODUCTS L L C — Tri-S ProSTUD

2C. **Framing Members* — Steel Studs** — As an alternate to Item 2 — For use with Item 1C, channel shaped studs, min 2-1/2 in. deep fabricated from min 0.018 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 1/2 in. less than assembly height.
TELLING INDUSTRIES L L C — TRUE-STUD™

2D. **Framing Members* — Steel Studs** — As an alternate to Item 2 — For use with Item 1D, channel shaped studs, min 2-1/2 in. deep, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper20™

FUSION BUILDING PRODUCTS — Viper20™

IMPERIAL MANUFACTURING GROUP INC — Viper20™

2E. **Framing Members* — Steel Studs** — As an alternate to Item 2 for a 2 hour rating only — For use with Item 1E, channel shaped studs, min 2-1/2 in. deep, spaced a max of 24 in. OC. Studs to be cut 3/4 in. less than assembly height.
MARINO/WARE, DIV OF WARE INDUSTRIES INC — Viper25™

FUSION BUILDING PRODUCTS — Viper25™

IMPERIAL MANUFACTURING GROUP INC — Viper25™

2F. **Framing Members* — Steel Studs** — As an alternate to Item 2 — For use with Item 1F, channel shaped studs, min 2-1/2 in. deep fabricated from min 0.018 in. thick galv steel, spaced a max of 24 in. OC. Studs to be cut 1/2 in. less than assembly height.
RESCUE METAL FRAMING, L L C — AlphaSTUD

3. **Lateral Bracing** — The bracing shall be in accordance with the SSMA Technical Note Dated March 2000 Referencing Unsheathed Flange Bracing.

3A. **Framing Members* — Lateral Bracing** — (Not Shown) — Right angle- shaped, supplied with notches spaced 12, 16, or 24 in. OC., friction-fitted to the cutouts in steel studs, supplied in 7/8 in. by 7/8 in. by 50 in. lengths. Lateral bracing bars fabricated from min. 20 MSG galvanized steel. The bracing shall be located a maximum of 5 ft on center in accordance with the manufacturers published literature.
CLARKDIETRICH BUILDING SYSTEMS — TradeReady Spazzer 9200 bar

4. **Batts and Blankets*** — Optional — Glass fiber batts may be friction-fitted to completely fill the stud cavities on one or both rows of studs.
See **Batts and Blankets** (BZJZ) Category for names of manufacturers.

5. **Gypsum Board*** — Nom 5/8 in. thick, 4 ft. wide, gypsum panels with beveled, square or tapered edges. Gypsum panels with beveled, square or tapered edges. **For single layer systems** gypsum panels applied vertically or horizontally with joints centered over studs. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered or backed by steel framing. Gypsum panels fastened to framing with 1 in. long Type S steel screws 12 in. OC along vertical edges and in the field. Screws spaced a max 12 in. along the top and bottom edges of the wall for both vertical and horizontal applications.. **For two layer systems** gypsum panels applied vertically or horizontally. Vertical joints centered over studs and staggered one stud cavity on opposite sides of studs and in adjacent layers. Horizontal joints need not be backed by steel framing. Horizontal edge joints and horizontal butt joints on opposite sides of studs need not be staggered. Horizontal edge joints in adjacent layers staggered a min of 12 in. First layer secured with 1 in. long Type S or S-12 steel screws, spaced 16 in. OC. Second layer secured with 1-5/8 in. long Type S or S-12 steel screws, spaced 16 in. OC with screws offset 8 in. from first layer. Screw spacings remain the same when applied to furring channels.
NATIONAL GYPSUM CO — Types eXP-C, FSK, FSK-C, FSK-G, FSL, FSW-C, FSW-G, FSW, FSW-3, FSW-5, FSW-6, FSMR-C

5A. **Gypsum Board*** — (As an alternate to Item 5 may be used as the base layer on one or both sides of wall. For direct attachment only) — Nom 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Gypsum board secured to studs with 1-1/4 in. long Type S-12 steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field.
RAY-BAR ENGINEERING CORP — Type RB-LBG

5B. **Gypsum Board*** — (As an alternate to Item 5 may be used as the base layer on one or both sides of wall. For direct attachment only) — Nom 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Wallboard secured to studs with 1-1/4 in. long Type S-12 steel screws gypsum panel steel screws spaced 8 in. OC at perimeter and 12 in. OC in the field. Lead batten strips required behind vertical joints of lead backed gypsum wallboard and optional at remaining stud locations. Lead batten strips, min 2 in. wide, max 8 ft long with a max thickness of 0.14 in. placed on the face of studs and attached to the stud with construction adhesive and two 1 in. long Type S-12 pan head steel screws, one at the top of the strip and one at the bottom of the strip. Lead discs, nominal 3/8 in. diam by max 0.085 in. thick. Compression fitted or adhered over the screw heads. Lead batten strips and discs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C".
RADIATION PROTECTION PRODUCTS INC — Type RPP-LBG

5C. **Gypsum Board*** — (As an alternate to Item 5 when used as the base layer on one or both sides of wall, For direct attachment only) — Nom 5/8 in. thick lead backed gypsum panels with beveled, square or tapered edges, applied vertically. Vertical joints centered over studs and staggered min 1 stud cavity on opposite sides of studs. Wallboard secured to studs with 1-1/4 in. long Type S-12 steel screws spaced 8 in. OC at perimeter and in the field when applied as the base layer. Lead batten strips required behind vertical joints of lead backed gypsum wallboard and optional at remaining stud locations. Lead batten strips, min 2 in. wide, max 10 ft long with a max thickness of 0.140 in. placed on the face of studs and attached to the stud with two 1 in. long Type S-8 pan head steel screws, one at the top of the strip and one at the bottom of the strip. Lead discs, max 5/16 in. diam by max 0.140 in. thick compression fitted or adhered over the screw heads. Lead batten strips and discs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grades "A, B, C or D". Fasteners for face layer gypsum panels (Items 5) when installed over lead backed board to be min 2-1/2 in. Type S-12 bugle head steel screws spaced as described in Item 6.
MAYCO INDUSTRIES INC — "X-Ray Shielded Gypsum"

5D. **Gypsum Board*** — (As an alternate to 5/8 in. Type FSW in Item 5) — Nom. 5/16 in. thick gypsum panels applied vertically or horizontally. Two layers of 5/16 in. for every single layer of 5/8 in. gypsum board described in Item 5. Horizontal joints on the same side need not be staggered. Inner layer of each double 5/16 in. layer attached with fasteners, as described in item 5, spaced 24 in. OC. Outer layer of each double 5/16 in. layer attached per Item 5.
NATIONAL GYPSUM CO — Type FSW

5E. **Gypsum Board*** — (As an alternate to Items 5 through 5D) — Nominal 5/8 in. thick, 4 ft wide panels, applied vertically only fastened to the studs and plates with 1 in. long, Type S steel screws spaced, 12 in. OC.
NATIONAL GYPSUM CO — Type SBWB

6. **Joint Tape and Compound** — (Not Shown) — Outer layer joints covered with joint compound and paper or mesh tape. Screw heads covered with joint compound. Paper or mesh tape and joint compound may be omitted when gypsum boards are supplied with square edges.

7. **Lead Batten Strips** — (Not Shown, For Use With Item 5A) — Used in lieu of or in addition to the lead batten strips (Item 8) or optional at other locations - Max 3/4 in. diam by max 0.125 in. thick lead discs compression fitted or adhered over steel screw heads or max 1/2 in. by 1-1/4 in. by max 0.125 in. thick lead tabs placed on gypsum boards (Item 5C) underneath screw locations prior to the installation of the screws. Lead discs or tabs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C".

8. **Lead Discs or Tabs** — (Not Shown, For Use With Item 5A) — Used in lieu of or in addition to the lead batten strips (Item 8) or optional at other locations - Max 3/4 in. diam by max 0.125 in. thick lead discs compression fitted or adhered over steel screw heads or max 1/2 in. by 1-1/4 in. by max 0.125 in. thick lead tabs placed on gypsum boards (Item 5C) underneath screw locations prior to the installation of the screws. Lead discs or tabs to have a purity of 99.9% meeting the Federal specification QQ-L-201f, Grade "C".

9. **Wall and Partition Facings and Accessories*** — (Optional, Not Shown) — For use with Item 5- Nominal 1/2 in. thick, 4 ft wide panels, for optional use as an additional layer on one or both sides of the assembly. Panels attached in accordance with manufacturer's recommendations. When the SoundBreak gypsum board is installed between the steel framing and the UL Classified gypsum board, the required UL Classified gypsum board layer(s) is/are to be installed as indicated as to fastener type and spacing, except that the required fastener length shall be increased by a minimum of 1/2 in. Not evaluated or intended as a substitute for the required layer(s) of UL Classified Gypsum Board.
NATIONAL GYPSUM CO — SoundBreak Gypsum Board.

10. **Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems, not for use with items 5A, 5B or 5C) — Furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel, 2-9/16 in. or 2-23/32 in. wide by 7/8 in. deep, spaced max. 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b.

b. **Steel Framing Members*** — Used to attach furring channels (Item 10a) to studs. Clips spaced max. 48 in. OC. RSIC-1 and RSIC-1 (2.75) clips secured to studs with No. 8 x 1-1/2 in. minimum self-drilling, S-12 steel screw through the center grommet. RSIC-V and RSIC-V (2.75) clips secured to studs with No. 8 x 9/16 in. minimum self-drilling, S-12 steel screw through the center hole. Furring channels are friction fitted into clips. RSIC-1 and RSIC-V clips for use with 2-9/16 in. wide furring channels. RSIC-1 (2.75) and RSIC-V (2.75) clips for use with 2-23/32 in. wide furring channels.
PAC INTERNATIONAL L L C — Types RSIC-1, RSIC-V, RSIC-1 (2.75), RSIC-V (2.75).

10A. **Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems, not for use with items 5A, 5B or 5C) — Furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel, 2-5/8 in. wide by 7/8 in deep, spaced 24 in. OC perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and tied together with double strand of No. 18 AWG galvanized steel wire.Gypsum board attached to furring channels as described in Item 5.

b. **Steel Framing Members*** — Used to attach furring channels (Item a) to studs. Clips spaced 48 in. OC., and secured to studs with 2 in. coarse drywall screw with 1 in. diam washer through the center hole. Furring channels are friction fitted into clips.
STUDCO BUILDING SYSTEMS — RESILMOUNT Sound Isolation Clips – Type A237R

10B. **Steel Framing Members*** — (Not Shown) — (Optional on one or both sides, not shown, for single or double layer systems, not for use with items 5A, 5B, or 5C) — Furring channels and Steel Framing Members as described below:

a. **Furring Channels** — Formed of No. 25 MSG galv steel, spaced 24 in. OC, and perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and secured in place with a double strand of No. 18 AWG twisted steel wire. Gypsum board attached to furring channels as described in Item 5.

b. **Steel Framing Members*** — Used to attach furring channels (Item 10Ba) to studs. Clips spaced 48 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Furring channels are friction fitted into clips.
REGUPOL AMERICA — Type SonusClip

10C. **Steel Framing Members*** — (Optional on one or both sides, not shown, for single or double layer systems, not for use with items 5A, 5B, or 5C) — Resilient channels and Steel Framing Members as described below:

a. **Resilient Channels** — Formed of No. 25 MSG galv steel, spaced 24 in. OC, and perpendicular to studs. Channels secured to studs as described in Item b. Ends of adjoining channels overlapped 6 in. and secured in place with two No. 8 15 x 1/2 in. Philips Modified Truss screws spaced 2-1/2 in. from the center of the overlap. Gypsum board attached to resilient channels as described in Item 5.

b. **Steel Framing Members*** — Used to attach resilient channels (Item 10Ca) to studs. Clips spaced 48 in. OC., and secured to studs with No. 8 x 2-1/2 in. coarse drywall screw through the center hole. Resilient channels are secured to clips with one No. 10 x 1/2 in. pan-head self-drilling screw.
KEENE BUILDING PRODUCTS CO INC — Type RC+ Assurance Clip

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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NORTHERN ARIZONA UNIVERSITY

Northern Arizona University - Student Athlete High Performance Center, Building 73A

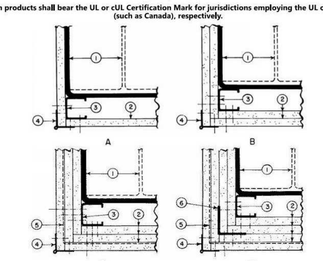
NAU Project: 09.731.191
1650 S. San Francisco Street, Flagstaff Arizona 86011 (SAHPC-73A)

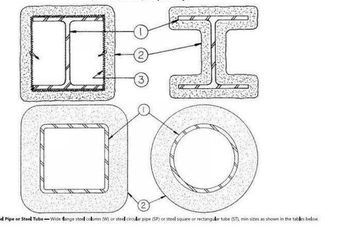
CONSTRUCTION DOCUMENTS
06.22.2020
Revisions

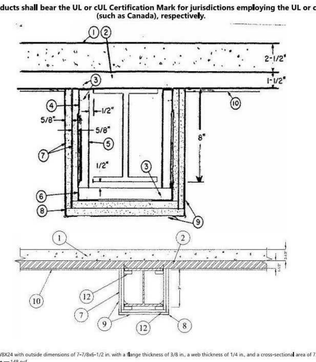
30-19131-00

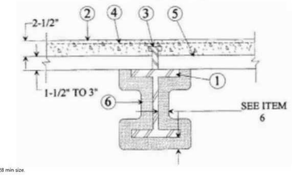
TESTED ASSEMBLIES

CP2.2









Design No. X528

February 26, 2020

Ratings — 1, 2 and 3 Hr.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

CORNER DETAILS OF WALLBOARD SUPPORT SYSTEMS WITHOUT STEEL COVERS

1. **Steel Column** — Min sizes of W-shaped and tubular steel columns which appear in the AISC Steel Construction Manual as shown under Item 2.

2. **Gypsum Board*** — **Any 1/2 in. thick UL Classified Gypsum Board that is eligible for use in Design No. X515. Any 5/8 in. thick UL Classified Gypsum Board that is eligible for use in Design Nos. L501, G512 or U305.** Nom 1/2 in. or 5/8 in. thick gypsum board. Applied in layers as noted in the above illustrations. Boards are to be applied vertically without horizontal joints. Min total thickness of layers in inches for the various ratings and min column sizes are as follows:

W Shaped Column Min Column Size	Rating (Hr) 1	2	3	Corner Details For Various Rating 1 Hr	2 Hr	3 Hr
Total thickness (In.)						
W4x13	1	1-1/2	2-1/4	B	C	D
W6x15.5	1	1-1/2	2-1/4	B	C	D
W10x49	1/2	1-1/8	1-7/8	A	B	C
Tube Shaped columns						
TS 4 by 4						
by0.188	1	1-3/4	2-5/8	B	C	D
TS 8 by 8						
by 0.250	5/8	1-1/2	2-1/4	A	C	D

AMERICAN GYPSUM CO (View Classification) — CKNX.R14196

BEIJING NEW BUILDING MATERIALS PUBLIC LTD CO (View Classification) — CKNX.R19374

CABOT MANUFACTURING ULC (View Classification) — CKNX.R25370

CERTAINTEED GYPSUM INC (View Classification) — CKNX.R3660

CGC INC (View Classification) — CKNX.R19751

GEORGIA-PACIFIC GYPSUM L L C (View Classification) — CKNX.R2717

LOADMASTER SYSTEMS INC (View Classification) — CKNX.R11809

NATIONAL GYPSUM CO (View Classification) — eXP-C, CKNX.R3501

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM (View Classification) — CKNX.R7094

PANEL REY S A (View Classification) — CKNX.R21796

SIAM GYPSUM INDUSTRY (SARABURI) CO LTD (View Classification) — CKNX.R19262

THAI GYPSUM PRODUCTS PCL (View Classification) — CKNX.R27517

UNITED STATES GYPSUM CO (View Classification) — CKNX.R1319

USG BORAL DRYWALL SFZ LLC (View Classification) — CKNX.R38438

USG MEXICO S A DE C V (View Classification) — CKNX.R16089

2A. **Gypsum Board*** — As an alternate to Item 2- 3/4 in. thick gypsum wallboard. For 2 Hr rating, 1-1/2 in. total thickness, installed in accordance with corner detail B. For 3 Hr rating, 2-1/4 in. total thickness installed in accordance with corner detail C. Boards are to be applied vertically without horizontal joints.
CGC INC — Type IP-X3 or ULTRACODE

UNITED STATES GYPSUM CO — Type IP-X3 or ULTRACODE

USG BORAL DRYWALL SFZ LLC — Type ULTRACODE

USG MEXICO S A DE C V — Type IP-X3 or ULTRACODE

2B. **Gypsum Board*** — (As an alternate to Items 2 and 2A) — Nominal 5/8 in. thick panels. One of the layers of **Gypsum Board** (Item 2) used to obtain the minimum required thickness in Item 2 may be substituted with one layer and secured as described in Item 2.
PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type QuietRock ES

2C. **Wall and Partition Facings and Accessories*** — (As an alternate to Item 2 through 2B) — Composite Gypsum Panel — Nominal 5/8 in. thick panels. One of the layers of **Gypsum Board** (Item 2) used to obtain the minimum required thickness in Item 2 may be substituted with one layer of composite gypsum panel and secured as described in Item 2.
PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Type QuietRock QR

3. **Steel Stud** — 1-5/8 in. wide with 1-5/16 and 1-7/16 in. legs having a 1/4- in. folded flange, fabricated from No. 25 MSG galv steel. Length to be 1/2 in. less than the assembly height.

3A. **As an alternate to Item 3 Steel Framing Members*** — galv. steel clips spaced 4 ft OC and 1-1/4 in. from top and bottom of column. A No. 28 MSG galv steel support angle with 1-1/4 in. length shall be placed over clips and secured with screws attaching the wallboard. The angle cut 1 in. less than assembly height splices in angle to occur over clips. The clips for use with wide flange columns only.
JOHN WAGNER ASSOCIATES INC, DBA GRABBER — Types CB, CB1Clips.

4. **Corner Beads** — No. 28 MSG galv steel, 1-1/4 in. legs to be attached to the wallboard with No. 6 by 1 in. screws spaced 12 in. OC max.

5. **Tie Wire** — No. 18 SWG steel wire spaced 24 in. OC used with second layer of wallboard.

6. **Screws** — For attaching first layer of wallboard to steel studs, and third layer of wallboard to 2 in. by 2 in. steel angle (25 Ga) to be No. 6 by 1 in. (or 1-1/4 in. for 3/4 in. thick wallboard) Phillips head self-drilling, self-tapping double lead screws spaced 24 in. OC For attaching second layer of wallboard to steel studs and fourth layer of wallboard to 2 in. by 2 in. steel angle (25 Ga) to be No. 6 by 1-3/4 in. (or 2-1/4 in. for 3/4 in. thick wallboard) steel screws of the same type spaced 12 in. OC For attaching third layer of wallboard to steel studs to be No. 8 by 2-1/4 in. screws of the same type spaced 12 in. OC

7. **Finishing System** — (Not Shown) — Joint compound applied over corner beads to a thickness of 1/16 in.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2020-02-26

Design No. X790

November 25, 2019

Ratings — 1, 1-1/2, 2, 3 and 4 Hr.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Steel Column, Steel Pipe or Steel Tube** — Wide flange steel column (W) or steel circular pipe (SP) or steel square or rectangular tube (ST), min sizes as shown in the tables below.

2. **Spray-Applied Fire Resistive Materials*** — Applied by mixing with water and spraying in one or more coats to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min average and min individual density of 15 and 14 pcf, for Types 300, 300AC, 300ES, 300HS, 300N, 3000, 3000ES and SB. For Types 400AC and 400ES min average and min individual density of 22 and 19 pcf, respectively. Min avg density of 44 pcf with min ind value of 40 pcf for Types M-II and TG. Min avg density of 47 pcf, with min individual value of 43 pcf for Type M-II/P. For method of density determination, see Design Information Section, Sprayed Material.
The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings of contour sprayed or boxed wide flange columns are shown in the table below:

Column Size	W/D	Min Thkns In. 1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
W6x9	0.33	15/16	1-1/4	1-9/16	2-1/8	2-11/16
W6x12	0.43	13/16	1-1/8	1-7/16	2	2-9/16
W6x16	0.57	11/16	1	1-5/16	1-7/8	2-3/8
W8x28	0.68	5/8	15/16	1-1/4	1-13/16	2-5/16
W10x49	0.83	9/16	13/16	1-1/8	1-5/8	2-1/8
W12x106	1.46	3/8	9/16	13/16	1-1/4	1-11/16
W14x233	2.52	1/4	3/8	1/2	7/8	1-3/16
W14x730	6.68	1/4	1/4	1/4	3/8	1/2

As an alternate to the above table, the required thickness of Spray-Applied Fire Resistive Materials to be applied to all surfaces of the steel columns for all rating periods may be determined from the following equations:

$$h = \frac{R}{75\,(W/D) + 32}$$

(for column W/D range of 0.33 to 2.51)

$$h = \frac{R}{75\,(W/D) + 15}$$

(for column W/D range of 2.51 to 6.68)

Where:

h = Spray-Applied Fire Resistive Materials thickness in the range of 1/4 to 4-1/2 in. (rounded up to the nearest 1/16 in.)

R = Fire resistance rating period in minutes (60-240 mins.)

D = Heated perimeter of the steel column in inches.

W = Weight of the steel column in lbs per foot.

The thicknesses contained in the table below are applicable when the Spray-Applied Fire Resistive Materials applied to the column's flange tips are reduced to one-half that shown in the table below (for contour application):

Column Size In.	Min Thkns In. 1 Hr	1-1/2 Hr	2 Hr	3 Hr	4 Hr
W6x9	1	1-3/8	1-3/4	2-7/16	3-1/8
W6x12	7/8	1-1/4	1-5/8	2-5/16	3-1/16
W6x16	3/4	1-1/8	1-7/16	2-1/16	2-11/16
W8x28	11/16	1	1-5/16	1-15/16	2-1/2
W10x49	5/8	15/16	1-3/16	1-3/4	2-3/8
W12x106	3/8	5/8	7/8	1-3/8	1-13/16
W14x233	5/16	3/8	9/16	15/16	1-5/16
W14x730	5/16	5/16	5/16	7/16	5/8

The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings of contour sprayed steel pipes or tubes are shown on the table below:

Min Column Size In.	A/P	1 Hr	1-1/2 Hr	Min Thkns In. 2 Hr	3 Hr	4 Hr
SP 4x0.237	0.22	11/16	1	1-3/8	2-1/16	2-3/4
ST 4x4x0.1875	0.18	3/4	1-1/16	1-7/16	2-1/16	2-11/16
ST 4x4x0.3125	0.29	1/2	13/16	1-1/8	1-3/4	2-5/16
ST 4x4x0.375	0.34	7/16	3/4	1	1-9/16	2-1/8
ST 4x4x0.5	0.44	3/8	9/16	7/8	1-3/8	1-7/8
ST20x20x0.75 in	0.72	5/16	1/2	11/16	1-1/16	1-7/16
ST20x20x1 in.	0.95	1/4	3/8	1/2	13/16	1-1/8
ST20x20x1.5 in.	1.39	1/4	1/4	3/8	5/8	13/16
ST20x20x1.75 in.	1.60	1/4	1/4	3/8	1/2	3/4
ST32x32x1.25 in.	1.20	1/4	5/16	7/16	11/16	15/16
ST 36x24x0.5	0.49	5/16	7/16	11/16	1-1/8	1-9/16

As an alternate to the table above, the required thickness of Spray-Applied Fire Resistive Materials to be applied to all surfaces of the steel pipes or tubes for all rating periods may be determined from the following equation:

$$\frac{R}{188\,(A/P) + 45}$$

Where:

h = Spray-Applied Fire Resistive Materials thickness in the range of 5/16 to 4-1/4 in. (rounded up to the nearest 1/16 in.)

R = Fire resistance rating in minutes (60-240 mins.)

A = Cross-sectional area of pipe or tube.

P = Heated perimeter of steel pipe or tube.

A/P = 0.18 to 0.49.

The A/P ratio of a circular pipe is determined by:

$$A/P = \frac{t\,(d - t)}{d}$$

Where:

d = the outer diameter of the pipe (in.)

t = the wall thickness of the pipe (in.)

The A/P ratio of a rectangular tube is determined by:

$$A/P = \frac{t\,(a + b - 2t)}{a + b}$$

Where:

a = the outer width of the tube (in.)

b = the outer length of the tube (in.)

t = the wall thickness of the tube (in.)

BERLIN CO LTD — Types 300, 300ES, 300N, SB, M-II, TG and M-II/P.

GREENTECH ASIA PACIFIC SDN BDH — Types 300, 300ES, 300HS, M-II, or M-II/P

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Types 300, 300AC, 300HS, 400AC, 3000, M-II, TG, and M-II/P.

ISOLATEK INTERNATIONAL — Type 300, 300AC, 300ES, 300HS, 300N, 400AC, 400ES, SB, 3000, 3000ES, M-II, TG and M-II/P.

NEWKEM PRODUCTS CORP — Types 300, 300ES, 300N, SB, M-II, TG and M-II/P.

2A. **(As an alternate to Item 2) Spray-Applied Fire Resistive Materials*** — Applied by mixing with water and spraying in one or more coats to the thicknesses shown below, to steel surfaces which are clean and free of dirt, loose scale, and oil. Min average and min individual density of 17.5 and 16 pcf, respectively, for Type 300TW. Min average and min individual density of 22 and 19 pcf, respectively, for Type 400. For method of density determination, see Design Information Section, Sprayed Material.
The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings is shown in Item 2.

BERLIN CO LTD — Type 400.

GREENTECH ASIA PACIFIC SDN BDH — Type 400

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Type 400.

ISOLATEK INTERNATIONAL — Type 300TW or Type 400.

NEWKEM PRODUCTS CORP — Type 400.

2B. **(As an alternate to Item 2 and 2A) — Spray-Applied Fire Resistive Materials*** — Prepared by mixing with water according to instructions on each bag of mixture and spray- or trowel-applied to steel surfaces which are free of dirt, oil or scale. Min average density of 17.5 pcf with min individual value of 17.0 pcf. For method of density determination, see Design Information Section, Sprayed Material.
The min thickness of Spray-Applied Fire Resistive Materials required for various fire resistance ratings is shown in Item 2.

ISOLATEK INTERNATIONAL — Type 280.

3. **Metal Lath** — (Optional for contour application) — 3.4 lb/sq yd galv or painted expanded steel lath. Lath shall be lapped 1 in. and tied together with No. 18 SWG galv steel wire spaced vertically 6 in. OC.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2019-11-25

Design No. N501

March 10, 2020

Restrained Beam Rating — 2 Hr.

Unrestrained Beam Rating — 2 Hr.

This design was evaluated using a load design method other than the Limit States Design Method (e.g., Working Stress Design Method). For jurisdictions employing the Limit States Design Method, such as Canada, a load restriction factor shall be used — See Guide BXUV or BXUV7

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Steel Beam — Min size, a W8X24 with outside dimensions of 7-7/8x6-1/2 in. with a flange thickness of 3/8 in., a web thickness of 1/4 in., and a cross-sectional area of 7.06 sq in.
1. **Normal Weight Concrete** — 148 pcf.

2. **Steel Floor and Form Units*** — 1-1/2 in. fluted type, welded to beam.

3. **Drill Screw** — No. 8-18 by 1/2-in. long Phillips panhead drill screws, self-drilling and self-tapping, made of case-hardened steel.

4. **Runner Angle** — 24 MSG galv steel with 1 and 2-in. legs. Fastened to steel deck 12 in. O.C. with Item 3.

5. **Channel Bracket** — Fabricated from 25 MSG galv steel, 1-11/16 in. deep with 1-in. legs and spaced 24 in. O.C. Fastened to the runner angles with Item 3.

6. **Corner Angle** — Same material as Item 4, fastened to channel brackets with Item 3.

7. **Gypsum Board*** — 5/8 in. thick. First layer fastened with 1-1/4 in. long, 0.150 in. diam screws spaced 16 in. O.C. Second layer attached with 1-3/4 in. long, 0.150 in. diam screws spaced 8 in. O.C. Screws are self-drilling and self-tapping Phillips head made of case-hardened steel.
AMERICAN GYPSUM CO — Types AGX-1, AG-C, LightRoc.

BEIJING NEW BUILDING MATERIALS PUBLIC LTD CO — Type DBX-1.

CABOT MANUFACTURING ULC — Type X, 5/8 Type X, Type Blueglass Exterior Sheathing

CERTAINTEED GYPSUM INC — Types EGRG, GlasRoc, GlasRoc-2, Type C, Type X, Type X-1, Easi-Lite Type X-2.

CGC INC — Type C, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX, ULIX.

CONTINENTAL BUILDING PRODUCTS OPERATING CO, L L C — Types LGFC6A, LGFC-C/A.

GEORGIA-PACIFIC GYPSUM L L C — Types 5, C, DAP, DD, DA, DAPC, DGG, DS, GPFS1, GPFS6, TG-C, Type X, Veneer Plaster Base-Type X, Water Rated-Type X, Sheathing Type-X, Soffit-Type X, GreenGlass Type X, Type LWX, Veneer Plaster Base-Type LWX, Water Rated-Type LWX, Sheathing Type-LWX, Soffit-Type LWX, Type LW2X, Veneer Plaster Base - Type LW2X, Water Rated - Type LW2X, Sheathing - Type LW2X, Soffit - Type LW2X.

NATIONAL GYPSUM CO — Types FSK, FSK-C, FSK-G, FSL, FSMR-C, FSW, FSW-C, FSW-G, FSW-3, FSW-6, FSW-8.

NATIONAL GYPSUM CO — Riyadh, Saudi Arabia — Type FR, or WR.

PABCO BUILDING PRODUCTS L L C, DBA PABCO GYPSUM — Types C, PG-3, PG-9, PG-11, PG-C, or PGS-WRS.

PANEL REY S A — Type PRC

SIAM GYPSUM INDUSTRY (SARABURI) CO LTD — Type EX-1

THAI GYPSUM PRODUCTS PCL — Type C, Type X.

UNITED STATES GYPSUM CO — Types C, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX, ULIX.

USG BORAL DRYWALL SFZ LLC — Types C, SCX

USG MEXICO S A DE C V — Types C, IP-X1, IP-X2, IPC-AR, SCX, SHX, WRX.

8. **Corner Bead** — Fabricated from 20 MSG galv steel to form an angle with 1-1/4 in. legs. Legs perforated with 1/4 in. diam holes approx 1 in. OC. Attached to wallboard with special crimping tool approx 6 in. OC. As an alternate, the bead may be nailed to the wallboard.

9. **Joint Compound** — 1/32 in. thick on bottom and sides of wallboard from corner beads and feathered out. Paper tape embedded in joint compound over joints with edges of compound feathered out.

10. **Protective Material — Spray-Applied Fire Resistive Materials*** — Spray applied to the underside of the steel floor units, filling the flutes of the units and providing a smooth ceiling which was 1/4 in. thick as measured from the bottom plane of the floor units.
See Spray-Applied Fire Resistive Materials (CHPX) category for names of manufacturers.

11. **Alternate Joint System** — (Not Shown) — For lath only. A 1/16 in. thickness of gypsum plaster applied to entire exposed surface over either paper tape on joints embedded in cementitious compound or 2 1/2 in. wide glass fiber tape stapled 8 in. OC on joints.

12. **Alternate Construction - Steel Framing Members*** — As an alternate to Items 3, 4, 5 and 6 steel clips attached to both sides of beam flanges 2 ft OC and at ends of beam. First layer of gypsum board fastened to steel clips with 1-1/4 in. long Type S drywall screws. 2 in. by 2 in. 25 MSG angle fastened to clips on bottom portion of assembly with 2 in. long Type S drywall screws. Second layer of gypsum board fastened to angle and steel clips with 2 in. long Type S drywall screws, spaced 2 ft OC. Screws are self-drilling and self-tapping Phillips head made of case-hardened steel.
JOHN WAGNER ASSOCIATES INC, DBA GRABBER — Type CB Clip.

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2020-03-10

Design No. N743

October 08, 2019

Restrained Beam Ratings — 1, 1-1/2, 2, 3 and 4 Hr

Unrestrained Beam Ratings — 1, 1-1/2, 2, 3 and 4 Hr

Loading Determined by Allowable Stress Design Method or Load and Resistance Factor Design Method published by the American Institute of Steel Construction, or in accordance with the relevant Limit State Design provisions of Part 4 of the National Building Code of Canada

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

1. **Steel Beam** — W8x28 min size.

2. **Normal Weight or Lightweight Concrete** — Normal weight concrete: carbonate or siliceous aggregate, 3500 psi compressive strength, unit weight 145 ± 3 pcf. Lightweight concrete: expanded shale, clay, or slate aggregate by rotary-kiln method, 3500 psi compressive strength, unit weight 110 ± 3 pcf.

3. **Shear Connector** — (Optional) — Studs, 3/4 in. diam headed type or equivalent per AISC specifications. Welded to the top flange of beam through the steel floor units.

4. **Welded Wire Fabric** — (Optional) — 6x6-10/10 SWG.

5. **Steel Floor and Form Units*** — 1-1/2 to 3 in. deep fluted, cellular or corrugated units in any combination welded to beam.

6. **Spray-Applied Fire Resistive Materials*** — Prepared by mixing with water. Spray-applied in one or more coats to beam surfaces to a min final thickness as shown in the tables below. Beam surfaces must be clean and free of dirt, loose scale and oil. Crest areas of deck above the beams shall be filled with Spray-Applied Fire Resistive Materials. Min average and min individual density of 15 pcf and 14 pcf respectively for Types 300, 300AC, 300ES, 300HS, 300N, 3000, 3000ES and SB. For Types 400, 400AC and 400ES min average and min individual density of 22 pcf and 19 pcf respectively. Min avg density of 44 pcf with min ind value of 40 pcf for Types M-II and TG. Min avg density of 47 pcf, with min individual value of 43 pcf for Type M-II/P. For method of density determination, see Design Information Section, Sprayed Material.
The thicknesses of Spray-Applied Fire Resistive Materials shown in the table below are applicable when the beams are supporting solid concrete slabs or floor assemblies containing only fluted floor or form units with normal weight concrete.

Rating Hr	Restrained Beam	Min Thkns In. Unrestrained Beam
1	3/8	3/8
1-1/2	7/16	9/16
2	11/16	3/4
3	1-1/16	1-3/16
4	1-7/16	1-5/8

The thicknesses of Spray-Applied Fire Resistive Materials shown in the table below are applicable when the beams are supporting solid concrete slabs or floor assemblies containing only fluted floor or form units with lightweight concrete.

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
1	1/2	1/2
1-1/2	5/8	3/4
2	7/8	1
3	1-3/8	1-5/8
4	1-7/8	2-1/4

The thicknesses of Spray-Applied Fire Resistive Materials shown in the table below are applicable when the beams are supporting floor assemblies containing cellular or corrugated floor units with normal weight concrete.

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
1	1/2	1/2
1-1/2	9/16	11/16
2	7/8	15/16
3	1-3/8	1-9/16
4	1-7/8	2-1/8

The thicknesses of Spray-Applied Fire Resistive Materials shown in the table below are applicable when the beams are supporting floor assemblies containing cellular or corrugated floor units with lightweight concrete.

Rating Hr	Min Thkns In. Restrained Beam	Unrestrained Beam
1	5/8	5/8
1-1/2	13/16	15/16
2	1-1/8	1-1/4
3	1-13/16	2-1/8
4	2-7/16	2-15/16

BERLIN CO LTD — Types 400, 300, 300ES, 300N, or SB; Types M-II, TG and M-II/P

GREENTECH ASIA PACIFIC SDN BDH — Types 300, 300ES, 300HS, 400, M-II, or M-II/P

GREENTECH THERMAL INSULATION PRODUCTS MFG CO L L C — Types 300, 300AC, 400, or 400AC; Types M-II, TG and M-II/P

ISOLATEK INTERNATIONAL — Types 300, 300AC, 300ES, 300HS, 300N, SB, 400, 400AC, 400ES, 3000, or 3000ES; Types M-II, TG and M-II/P

NEWKEM PRODUCTS CORP — Types 300, 300ES, 300N, 400, or SB; Types M-II, TG and M-II/P

System No. HW-D-0572

September 01, 2016

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width — 1-1/2 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 50% Compression and Extension	FH Ratings — 1 and 2 Hr (See Item 2)
	FTH Ratings — 1 and 2 Hr (See Item 2)
	Nominal Joint Width — 1-1/2 In.
	Class II Movement Capabilities — 50% Compression and Extension

1. **Floor Assembly** — Min 2-1/2 in. (64 mm) thick lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) structural concrete. Floor may also consist of any min 6 in. (152 mm) thick UL Classified hollow-core **Precast Concrete Units***.
See **Precast Concrete Units** (CAZT) category in the Fire Resistance Directory for names of manufacturers.

2. **Shaft Wall Assembly** — The 1 hr or 2 hr fire rated gypsum board/steel stud shaft wall assembly shall be constructed of the materials and in the manner described in the individual U400, V400 or W400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Floor and Wall Runners** — (Not Shown) - J-shaped runner, sized equal in width to steel studs (Item 2C),with unequal legs of 1 in. (25 mm) and 2 in. (51 mm), fabricated from 24 MSG galv steel. Runners positioned with short leg toward finished side of wall. Runners attached to floor with steel fasteners located not greater than 2 in. (51 mm) from ends and not greater than 24 in. (610 mm) OC.

B. **Ceiling Runner** — Ceiling runner shall consist of galv steel channel sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner secured with steel fasteners located not more than 2 in. (51 mm) from ends and spaced not greater than 24 in. (610 mm) OC.

B1. **Light Gauge Framing* - Slotted Ceiling Runner** — As an alternate to the ceiling runner in Item 2B, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Flange height of slotted ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Slotted ceiling runner secured with steel fasteners located not more than 2 in. (51 mm) from ends and spaced max 24 in. (610 mm) OC.
BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK

CALIFORNIA EXPANDED METAL PRODUCTS CO — CST

CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT

METAL-LITE INC — The System

RAM SALES L L C — RAM Slotted Track

SCAFCO STEEL STUD MANUFACTURING CO — Slotted Track

TELLING INDUSTRIES L L C — True-Action Deflection Track

C. **Steel Studs** — C-H shaped studs, min 4 in. (102 mm) wide by 1-1/2 in. (38 mm) deep, fabricated from 25 MSG galv steel, cut to lengths 3/4 to 1 in. (19 to 25 mm) less than floor to ceiling height and spaced 24 in. (610 mm) OC.

D. **Gypsum Board*** — Nom 1 in. (25 mm) thick gypsum board liner panels. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. Vertical edges inserted in H-shaped section of C-H studs. At the ends of the assembly, the free edge of the end panels are attached to the long leg of vertical J-runners (Item 2A) with 1-5/8 in. (41 mm) long Type S steel screws spaced max 12 in. (305 mm) OC.

E. **Gypsum Board*** — Nom 5/8 in. (16 mm) thick gypsum board applied vertically in one or two layers for 1 hr and 2 hr fire rated assemblies, respectively. Panels cut 1-1/2 in. (38 mm) less in length than floor to ceiling height. The screws attaching the gypsum board layers to the C-H studs shall be located 1 to 1-1/2 in. (25 to 38 mm) below the bottom of the ceiling runner or slotted ceiling track. No gypsum board attachment screws are to penetrate the ceiling runner or slotted ceiling track.

The hourly ratings of the joint system are equal to the hourly fire rating of the wall.

3. **Joint System — Max separation between bottom of floor and top of gypsum board (at the time of installation of the joint system) is 1 1/2 in. (38 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width.** The joint system consists of the following:

A. **Forming Material*** — Min 4 pcf (64 kg/m^3) density mineral wool batt insulation cut to a thickness twice larger than the distance between the top of the gypsum board and the bottom of the floor. Material compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Material compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the floor, flush with the surface of the wall.
ROCK WOOL MANUFACTURING CO — Delta Board

ROCKWOOL — SAFE

THERMAFIBER INC — Type SAF

A1. **Forming Material* - Strips** — As an alternate to Item 2A, the strips are stacked to a height twice larger than the distance between the top of the gypsum board and the bottom of the floor. Strips compressed 50 percent and installed within ceiling runner above top of liner panel flush with the inside surface of the panel. Strips compressed and installed on finished side of the wall between the top of the gypsum board and the bottom of the floor, flush with the surface of the wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips

B. **Fill, Void or Cavity Material*** — Min 1/16 in. (1.6 mm) dry thickness (1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled within stud cavity and on finished side of the shaft wall to completely cover mineral wool forming material. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and ceiling runner within stud cavity. Fill material to overlap a min of 1/2 in. (13 mm) onto gypsum board and concrete on finished side of wall.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 672 Firestop Spray or CFS-SP WB Firestop Joint Spray

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

Last Updated on 2016-09-01

System No. HW-D-0034

September 01, 2016

ANSI/UL2079	CAN/ULC S115
Assembly Ratings — 1 and 2 Hr (See Item 2)	F Ratings — 1 and 2 Hr (See Item 2)
Nominal Joint Width — 1 In.	FT Ratings — 1 and 2 Hr (See Item 2)
Class II Movement Capabilities — 7% or 25% Compression or Extension (See Items 1C, 1A-D)	FH Ratings — 1 and 2 Hr (See Item 2)
L Rating At Ambient — Less Than 1 CFM/sq ft	FTH Ratings — 1 and 2 Hr (See Item 2)
L Rating At 400 F — Less Than 1 CFM/sq ft	Nominal Joint Width — 1 In.
	Class II Movement Capabilities — 7% or 25% Compression or Extension (See Items 1C, 1A-D)
	L Rating At Ambient — Less Than 1 CFM/sq ft
	L Rating At 400 F — Less Than 1 CFM/sq ft

1. **Floor Assembly** — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor And Form Units*** — Max 3 in. (76 mm) deep galv steel fluted floor units.

B. **Concrete** — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.

C. **Spray-Applied Fire Resistive Material*** — (Optional, Not Shown) — After installation of the ceiling runner (Item 2A) or deflection channel (Item 3A), steel floor units to be sprayed with a min 5/16 in. (8 mm) to max 11/16 in. (17 mm) thickness of material in accordance with the specifications in the individual D700 or D800 Series Design. When spray applied fire resistive material is used, ceiling runner or deflection channel to be provided with 2 in. (51 mm) flanges. Excess material to be scraped from flanges of ceiling runner or deflection channel prior to installation of gypsum board. **When Spray-Applied Fire Resistance Material is used, Class II Movement Capabilities restricted to COMPRESSION ONLY.**
ISOLATEK INTERNATIONAL — Type 300

GCP APPLIED TECHNOLOGIES INC — MK-6/HY

1A. **Roof Assembly** — (Not Shown) — As an alternate to the floor assembly (Item 1), a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700, P800 or P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly fire rating of the roof assembly shall be equal to or greater than the hourly fire rating of the wall assembly. The roof assembly shall include the following construction features:

A. **Steel Roof Deck** — Max 3 in. (76 mm) deep galv steel fluted roof deck.

B. **Roof Insulation** — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the steel roof deck.

C. **Roof Covering*** — Hot-mopped or cold-application materials compatible with insulating concrete.

D. **Spray-Applied Fire Resistive Material*** — (Optional, Not Shown) — After installation of the ceiling runner (Item 2A) or deflection channel (Item 3A), steel floor units to be sprayed with a min 5/16 in. (8 mm) to max 11/16 in. (17 mm) thickness of material in accordance with the specifications in the individual P700 or P800 Series Design. When spray applied fire resistive material is used, ceiling runner or deflection channel to be provided with 2 in. (51 mm) flanges. Excess material to be scraped from flanges of ceiling runner or deflection channel prior to installation of gypsum board. **When Spray-Applied Fire Resistance Material is used, Class II Movement Capabilities restricted to COMPRESSION ONLY.**
GCP APPLIED TECHNOLOGIES INC — MK-6/HY

ISOLATEK INTERNATIONAL — Type 300

1B. **Floor Assembly** — (Not Shown) — As an alternate to the floor assembly (Item 1), min 4-1/2 in. (114 mm) thick structural concrete (100-150 pcf or 1600-2400 kg/m^3) or min 6 in. (152 mm) thick hollow-core **Precast Concrete Units***.
See **Precast Concrete Units** (CFTV) category in Fire Resistance Directory for names of manufacturers.

2. **Wall Assembly** — The 1 or 2 hr fire rated gypsum board/stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

A. **Steel Floor and Ceiling Runners** — Floor and ceiling runners of wall assembly shall consist of galv steel channels sized to accommodate steel studs. Ceiling runner to be provided with min 1-1/4 in. (32 mm) to max 2 in. (51 mm) flanges. When deflection channel (Item 3A) is used, flange height of ceiling runner is to be equal to or greater than flange height of deflection channel and the ceiling runner is to nest within the deflection channel with a 1/2 to 3/4 in. (13 to 19 mm) gap maintained between the top of the ceiling runner and the top of the deflection channel. When deflection channel is not used, ceiling runner to be provided with min. 1-1/2 in. (38 mm) flanges. Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors or welds spaced max 24 in. (610 mm) OC.

A1. **Light Gauge Framing* - —Slotted Ceiling Runner** — As an alternate to the ceiling runner in Item 2A, ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Items 2B). Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors spaced max 24 in. (610 mm) OC. When slotted ceiling runner is used, deflection channel (Item 3A) shall not be used.
BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK

CALIFORNIA EXPANDED METAL PRODUCTS CO — CST

CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H

MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT

QUAIL RUN BUILDING MATERIALS INC — Slotted Deflection Track

RAM SALES L L C — RAM Slotted Track

SCAFCO STEEL STUD MANUFACTURING CO

STEELER INC — Steeler Slotted Ceiling Runner

TELLING INDUSTRIES L L C — True-Action Deflection Track

A2. **Light Gauge Framing — Floor and Ceiling Runners** — As an alternate to the ceiling and floor runners in Item 2A, 2A1 and 2A2, floor and ceiling runners to consist of galv steel channel sized to accommodate the **Light Gauge Framing*** Slotted Stud (Item 2B1) or **Light Gauge Framing*** Slider C-Clip System (Item 2B2). Floor and ceiling runners to be provided with min 1-1/4 in. and 3 in. (32 and 76 mm) flanges, respectively. Ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors spaced max 12 in. (305 mm) OC. When ceiling runner is used, deflection channel (Item 3A) shall not be used.
STEELER INC — Floor and Ceiling Runners

A3. **Light Gauge Framing* — Notched Ceiling Runner** — As an alternate to the ceiling runners in Items 2A through 2A3, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2B). Notched ceiling runner installed perpendicular to direction of fluted steel deck and secured to valleys with steel masonry anchors spaced max 24 in. (610 mm) OC. When notched ceiling runner is used, deflection channel (Item 3A) shall not be used.
OLMAR SUPPLY INC — Type SCR

A4. **Steel Framing Members* — Sound Isolation Clips** — (Not Shown) — As an alternate attachment means for the ceiling runner to the bottom of the floor or roof assembly when no deflection channel (Item 3A) is used, sound isolation clips installed in accordance with the accompanying installation instructions. Sound isolation clip installed through nom 1 in. (25 mm) diam hole in ceiling runner and attached to top of ceiling runner using four min No. 8 by 1/2 in. (13 mm) long self-tapping galv steel screws. Sound isolation clips to be installed adjacent to every stud location but not more than 24 in. (610 mm) OC and attached to the underside of floor or roof assembly using min 3/16 in. (5 mm) diam by 2-1/2 in. (64 mm) long steel masonry anchors.
PAC INTERNATIONAL L L C — Type RSIC-U-HD

B. **Studs** — Steel studs to be min 3-1/2 in (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and secured to floor runner. When deflection channel (Item 3A) is used, steel studs attached to ceiling runner with sheet metal screws located 1/2 in. (13 mm) below the bottom to the deflection channel. When deflection channel is not used, studs to nest in ceiling runner without attachment. When slotted ceiling runner (Item 2A2) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC.

B1. **Light Gauge Framing* — Slotted Studs** — Slotted steel stud to be used in conjunction with **Light Gauge Framing* — Floor and Ceiling Runners** (Item 2A3). Slotted steel studs to be min 3-1/2 in. (89 mm) wide. Slotted steel studs cut 1 in. (25 mm) less in length than assembly height with bottom nesting in and secured to both ceiling and floor runners. Ceiling runner secured to preformed slot within steel stud by means of No. 10 by 3/4 in. (19 mm) long low profile head steel screw. Floor runner attached to bottom of steel stud by means of No. 8 by 1/2 in. (13 mm) long pan head steel screw. Slotted steel stud spacing not to exceed 24 in. (610 mm) OC.
STEELER INC — Slotted Stud

B2. **Light Gauge Framing* — Slider C-Clip System** — As an alternate to the **Light Gauge Framing* — Slotted Steel Studs** (Item 2B1), a Slider C-Clip System consisting of a C shaped steel clip with a slotted opening and a steel stud to be used in conjunction with **Light Gauge Framing — Floor and Ceiling Runners** (Item 2A3). Steel clips and studs to be min 3-1/2 in. (89 mm) wide. Steel clip inserted into inside flange of steel stud without attachment. Total length of steel stud cut 1 in. (25 mm) less than assembly height with bottom of steel stud nesting in and secured to floor runner. Floor runner attached to bottom of steel stud by means of No. 8 by 1/2 in. (13 mm) long pan head steel screw. Ceiling runner secured to steel C-Clip by means of No. 10 by 3/4 in. (19 mm) long pan head steel screw located 3/8 in. (10 mm) below top of ceiling runner. Top row of gypsum board screws shall be centered within the preformed slot of the C-Clip. Steel stud and steel clips spacing not to exceed 24 in. (610 mm) OC.
STEELER INC — Slider C Clip System

C. **Gypsum Board*** — Gypsum board sheets installed to a min total thickness of 5/8 in. or 1-1/4 in. (16 or 32 mm) on each side of wall for 1 hr or 2 hr fire rated wall, respectively. Wall to be constructed in the individual U400 or V400 Series Design in the UL Fire Resistance Directory, except that a nom 1 in. (25 mm) gap shall be maintained between the top of the wallboard and the bottom surface of the steel floor or roof deck. The screws attaching the gypsum board to the studs along the top of the wall shall be located 1 in. (25 mm) below the bottom of the ceiling runner. No gypsum board attachment screws shall be driven into the ceiling runner or into the optional deflection channel
The hourly fire rating of the joint system is dependent upon the hourly fire rating of the wall assembly in which it is installed.

2A. **Through Penetrant** — (Optional, Not Shown) — Nom 3/8 in. or 1/2 in. (10 or 13 mm) diam rigid steel conduit, steel electrical metallic tubing (EMT) or 1-1/2 in. (38 mm) Sch 40 PVC conduit may be installed within the flutes of the steel floor or roof deck. The conduit or EMT shall be located near the middepth of the steel deck with a clearance of 1/2 to 1-1/2 in. 13 to 38 mm) between the conduit or EMT and the steel deck. A max of one conduit or EMT is permitted in an individual flute. **When conduit or EMT is installed in flute of steel deck, the hourly rating of the joint system is 1 hr.**

3. **Joint System — Max separation between bottom of floor or roof deck and top of wall (at time of installation of joint system) is 1 in. (25 mm). The joint system is designed to accommodate a max 7% (for SpecSeal LC150 Sealant) or 25 % (for SpecSeal ES Sealant) compression or extension from its installed width.** The joint system shall consist of forming and fill materials, with or without a deflection channel (Item 3A), as follows:

A. **Deflection Channel** — (Optional) — Max 2 in. (51 mm) deep min 24 gauge galv steel channel sized to accommodate ceiling runner (Item 2A). Deflection channel installed perpendicular to direction of fluted steel deck and secured to valleys of with steel masonry anchors or welds spaced max 24 in. (610 mm) OC. The ceiling runner (Item 2A) is installed within the deflection channel to maintain a 1/2 to 3/4 in. (13 to 19 mm) gap between the top of the ceiling runner and the top of the deflection channel. The ceiling runner nests inside the deflection channel without attachment.

B. **Forming Material*** — Min 4-1/4 in. or 5-5/8 in. (108 or 149 mm) depth, for 1 hr or 2 hr fire rated wall, respectively, of 4 pcf (64 kg/m^3) mineral wool batt insulation cut to the shape of the fluted deck, approx 20 percent larger than the area of the flutes and compressed into the flutes of the steel floor or roof deck between the top of the deflection channel and the steel floor or roof deck. When sound isolation clips (Item 2A5) are used, the space between the top of the ceiling runner and the underside of the floor or roof shall be tightly packed with mineral wool batt insulation. Additional 2 in. (51 mm) thick by 1 in. (25 mm) wide sections of mineral wool batt insulation are compressed 50 percent and installed cut edge first to fill the 1 in. (25 mm) gap between the top of the wall and bottom of the steel floor or roof deck. The forming material shall be recessed from each surface of wall to accommodate the required thickness of fill material (Item 3C).
ROCK WOOL MANUFACTURING CO — Delta Safing

ROCKWOOL MALAYSIA SDN BHD — Safe

ROCKWOOL — Safe

THERMAFIBER INC — Type SAF

B1. **Forming Material*** — (Optional, Not Shown) — Preformed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling channel. The plugs shall project beyond each side of the ceiling runner and shall be recessed from both wall surfaces to accommodate the required thickness of fill material (Item 3C). Additional forming material, described in Item 3B, to be used in conjunction with the plugs to fill the gap between the top of gypsum board and bottom of steel deck.
THERMAFIBER INC — TopStop mineral wool deck plugs Type SAF batts

C. **Fill, Void or Cavity Material* — Sealant** — Min 1/4 in. (6 mm) thickness of fill material installed on each side of the wall in the flutes of the steel floor or roof deck and between the top of the wall and the bottom of the steel floor or roof deck, flush with each surface of wall.
SPECIFIED TECHNOLOGIES INC — SpecSeal ES Sealant, SpecSeal LC150 Sealant

*** Indicates such products shall bear the UL or cUL Certification Mark for jurisdictions employing the UL or cUL Certification (such as Canada), respectively.**

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CONSTRUCTION
DOCUMENTS
06.22.2020
Revisions

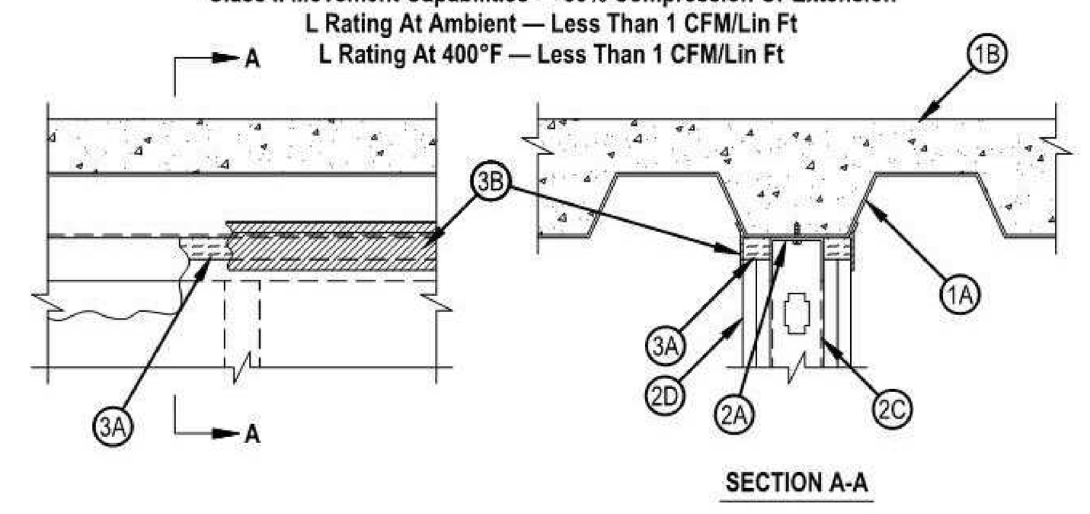
30-19131-00

TESTED
ASSEMBLIES

CP2.3

System No. HW-D-0049

Assembly Ratings — 1 and 2 Hr (See Items 2 and 3B)
Nominal Joint Width — 1 In.
Class II Movement Capabilities — 50% Compression Or Extension
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft



1. Floor Assembly — The fire-rated fluted steel deck/concrete floor assembly shall be constructed of the materials and in the manner described in the individual D700 or D900 Series Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor And Form Units* — Max 3 in. (76 mm) deep galv steel fluted units.
   B. Concrete — Min 2-1/2 in. (64 mm) thick reinforced concrete, as measured from the top plane of the floor units.
   C. Spray-Applied Fire Resistive Materials* — (Optional) - (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (44 mm) thickness of fire resistive material.
   W R GRACE & CO - CONN — Type MK-6-HY
   ISOLATEK INTERNATIONAL — Type 300
   1A. Roof Assembly — (Not Shown) — As an alternate to the floor assembly, a fire rated fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Roof Insulation — Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.
   1B. Roof Assembly — As an alternate to Items 1 and 1A, a fire rated protected fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described in the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roof assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:
   A. Steel Roof Deck — Max 3 in. (76 mm) deep galv steel fluted roof deck.
   B. Spray—Applied Fire Resistive Materials* — (Not Shown)—Prior to or after the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.
   W R GRACE & CO - CONN — Type MK-6-HY
   ISOLATEK INTERNATIONAL — Type 300
2. Wall Assembly — The 2 hr fire rated gypsum board /steel stud wall assembly shall be constructed of the materials and in the manner described in the individual U400 or V400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Steel Floor And Ceiling Runners — Floor and ceiling runners of wall assembly shall consist of min 25 ga galv steel channels sized to accommodate steel studs (Item 2C). Flange height of ceiling runner shall be min 1/4 in. (6 mm) greater than max extended joint width. Ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   A1. Light Gauge Framing*-Slotted Ceiling Runner — As an alternate to the ceiling runner in Item 2A, slotted ceiling runner to consist of galv steel channel with slotted flanges sized to accommodate steel studs (Item 2C). Slotted ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   BRADY CONSTRUCTION INNOVATIONS INC, DBA SLIPTRACK SYSTEMS — SLP-TRK
   CALIFORNIA EXPANDED METAL PRODUCTS CO — CST
   CLARKDIETRICH BUILDING SYSTEMS — Type SLT, SLT-H
   MARINO/WARE, DIV OF WARE INDUSTRIES INC — Type SLT
   METAL-LITE INC — The System
   SCAFCO STEEL STUD MANUFACTURING CO
   STEELER INC — Steeler Slotted Ceiling Runner
   TELLING INDUSTRIES L L C — True-Action Deflection Track
   A2. Light Gauge Framing*-Vertical Deflection Ceiling Runner — As an alternate to the ceiling runners in Items 2A and 2A1, vertical deflection ceiling runner to consist of galv steel channel with slotted vertical deflection clips mechanically fastened within runner. Slotted clips, provided with step bushings, for permanent fastening of steel studs. Flanges sized to accommodate steel studs (Item 2C). Vertical deflection ceiling runner installed parallel to direction of fluted steel deck, centered beneath deck, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   THE STEEL NETWORK INC — VertiTrack VTD250, VTD362, VTD400, VTD600 and VTD800
   A3. Light Gauge Framing —Floor and Ceiling Runners — As an alternate to the ceiling and floor runners in Item 2A, 2A1, 2A2 and 2A3, floor and ceiling runners to consist of galv steel channel sized to accommodate the Light Gauge Framing* Slotted Stud (Item 2C1) or Light Gauge Framing* Slider C-Clip System (Item 2C2). Floor and ceiling runners to be provided with min 1-1/4 in. (32 mm) and 3 in. (76 mm) flanges, respectively. Ceiling runner installed parallel to direction of fluted steel deck, centered beneath deck, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   STEELER INC — Floor and Ceiling Runners
   A4. Light Gauge Framing*- Notched Ceiling Runner — As an alternate to the ceiling runners in Items 2A through 2A4, notched ceiling runners to consist of C-shaped galv steel channel with notched return flanges sized to accommodate steel studs (Item 2C). Notched ceiling runner installed parallel to direction of fluted steel deck, centered beneath valley, and secured with steel masonry anchors, steel fasteners or welds spaced max 24 in. (610 mm) OC. before or after optional spray-applied fire resistive material is used. The use of welds to secure the ceiling runner may only be used prior to the installation of the optional spray-applied material.
   OLMAR SUPPLY INC — Type SCR
   B. Steel Attachment Clips — (Optional - Not Shown) - When spray applied fireproofing is used ceiling runner may be secured to deck with Z-shaped clips formed from min 1 in. (25 mm) long strips of min 20 ga galv steel. Length of clips should not exceed the width (thickness) of the wall. Clips to be sized to extend through the thickness of the spray-applied fire-resistive material on the bottom of the steel deck with 1-1/2 or 2 in. (38 or 51 mm) long upper and lower legs. Legs of clips fastened perpendicular to valleys of steel deck (prior to application of spray-applied fire-resistive materials) and top of ceiling runner with steel fasteners or welds. Clips spaced max 24 in. (610 mm) OC.
   C. Studs — Steel studs to be min 2-1/2 in. (64 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. When slotted ceiling runner (Item 2A1) is used, steel studs secured to slotted ceiling runner with No. 8 by 1/2 in. (13 mm) long wafer head steel screws at midheight of slot on each side of wall. Stud spacing not to exceed 24 in. (610 mm) OC. When vertical deflection ceiling runner (Item 2A2) is used, steel studs secured to slotted vertical deflection clips, through the bushings, with steel screws at midheight of each slot. Stud spacing not to exceed 24 in. (610 mm) OC.
   C1. Light Gauge Framing* —Slotted Studs — Slotted steel stud to be used in conjunction with Light Gauge Framing* —Floor and Ceiling Runners (Item 2A4). Slotted steel studs to be min 2-1/2 in. (64 mm) wide. Slotted steel studs cut 1 in. less in length than assembly height with bottom nesting in and secured to both ceiling and floor runners. Ceiling runner secured to preformed slot within steel stud by means of No. 10 by 3/4 in. (19 mm) long low profile head steel screw. Floor runner attached to bottom of steel stud by means of No. 8 by 1/2 in. (13 mm) long pan head steel screw. Slotted steel stud spacing not to exceed 24 in. (610 mm) OC.
   STEELER INC — Slotted Stud
   C2. Light Gauge Framing* —Slider C-Clip System — As an alternate to the Light Gauge Framing* —Slotted Steel Studs (Item 2C1), a Slider C-Clip System consisting of a C shaped steel clip with a slotted opening and a steel stud to be used in conjunction with Light Gauge Framing —Floor and Ceiling Runners (Item 2A4). Steel clips and studs to be min 2-1/2 in. (64 mm) wide. Steel clip inserted into inside flange of steel stud without attachment. Total length of steel stud cut 1 in. (25 mm) less than assembly height with bottom of steel stud nesting in and secured to floor runner. Floor runner attached to bottom of steel stud by means of No. 8 by 1/2 in. (13 mm) long pan head steel screw. Ceiling runner secured to steel C-Clip by means of No. 10 by 3/4 in. (19 mm) long pan head steel screw located 3/8 in. (10 mm) below top of ceiling runner. Top row of gypsum board screws shall be centered within the preformed slot of the C-Clip. Steel stud and steel clips spacing not to exceed 24 in. (610 mm) OC.
   STEELER INC — Slider C Clip System
   D. Gypsum Board* — Gypsum board installed to a min total thickness of 5/8 in. (16 mm) and 1-1/4 in. (32 mm) on each side of wall for 1 and 2 Hr rated assemblies respectively. Wall to be constructed as specified in the individual Wall and Partition Design in the UL Fire Resistance Directory, except that a nom 1 in. (25 mm) gap shall be maintained between the top of the gypsum board and the bottom of the steel floor units and the top row of screws shall be installed into the studs 1-1/2 (38 mm) to 2 in. (51 mm) below the bottom of the ceiling runner. The hourly rating of the joint system is equal to the hourly fire rating of the wall.
3. Joint System — Max separation between bottom of floor and top of wall at time of installation of joint system is 1 in. (25 mm). The joint system is designed to accommodate a max 50 percent compression or extension from its installed width. The joint system consists of forming material and a fill material, as follows:
   A. Forming Material* — Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide strips of min 4 pcf (64 kg/m3) mineral wool batt insulation for 1 and 2 hr rated assemblies respectively, cut to thickness, compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall.
   ROCK WOOL MANUFACTURING CO — Delta- Board
   ROXUL INC — SAFE
   THERMAFIBER INC — Type SAF
   IIG MINWOOL L L C — MinWool-1200 Safing
   A1. Forming Material* - Strips — (Optional) - Nom 5/8 in. (16 mm) and 1-1/4 in. (32 mm) wide precut mineral wool strips for 1 and 2 hr rated assemblies respectively. The strips are compressed 50 percent in thickness and firmly packed into the gap between the top of the gypsum board and bottom of the steel floor units on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP 767 Speed Strips
   B. Fill, Void or Cavity Material* — Min 1/16 in. (1.6 mm) dry thickness (min 1/8 in. or 3.2 mm wet thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto gypsum board and steel deck on both sides of wall. When spray-applied fire resistive material is applied to the steel floor and form units, the fill material is to overlap the gypsum board a min of 1/2 in. (13 mm) and the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of wall. When spray-applied fire resistive materials are used, the joint spray shall overlap the wall a min 1/2 in. (13 mm) and overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CFS-SP WB Firestop Joint Spray

System No. HW-D-0098

June 04, 2010

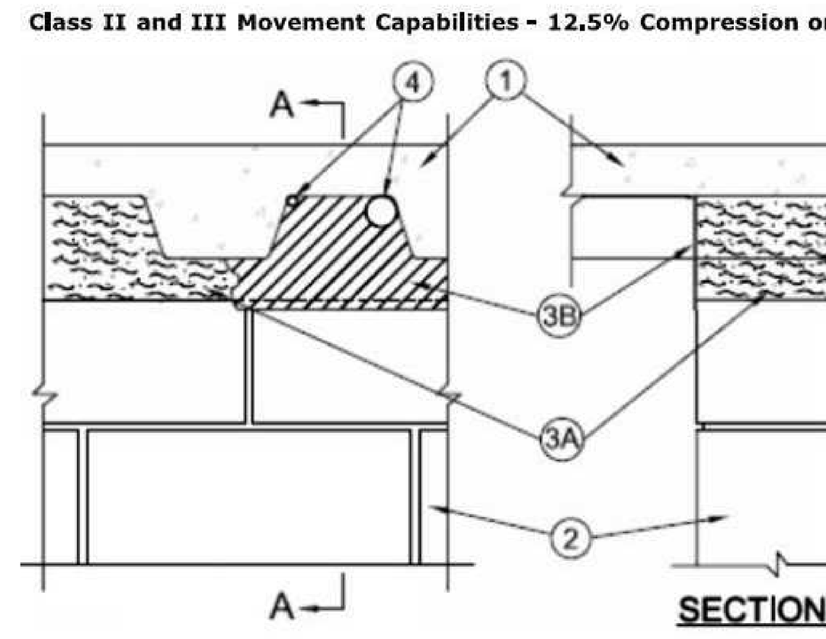
Assembly Rating — 1 and 2 Hr (See Item 4)

Nominal Joint Width - 1 in.

L Rating At Ambient — Less Than 1 CFM/Lin Ft (See Item 4)

L Rating At 400°F — Less Than 1 CFM/Lin Ft (See Item 4)

Class II and III Movement Capabilities - 12.5% Compression or Extension



1. **Floor Assembly —** The fire rated fluted steel unit/concrete floor assembly shall be constructed of the materials and in a manner described in the individual D700 or D900 Floor-Ceiling Design in the UL Fire Resistance Directory and shall include the following construction features:

   A. **Steel Floor and Form Units* —** Max 3 in. (76 mm) deep galv steel fluted floor units.

   B. **Concrete —** Min 2-1/2 in. (64 mm) thick reinforced concrete as measured from top plane of the floor units.

   C. **Spray-Applied Fire Resistive Materials* —** (Optional)—(Not Shown)—Prior to the installation of the forming material and fill, void or cavity material (Items 3A, 3B) the steel floor units may be sprayed with a min 5/16 in. (8 mm) to max 1-3/4 in. (44 mm) thickness of fire resistive material.

   W R GRACE & CO - CONN — Type MK-6-HY

   ISOLATEK INTERNATIONAL — Type 300

1A. **Roof Assembly —** (Not Shown) — As an alternate to the floor assembly, a fire rated fluted steel deck ro assembly may be used. The roof assembly shall be constructed of the materials and in the manner described i the individual P900 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roc assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

   A. **Steel Roof Deck —** Max 3 in. (76 mm) deep galv steel fluted roof deck.

   B. **Roof Insulation —** Min 2-1/4 in. (57 mm) thick poured insulating concrete, as measured from the top plane of the floor units.

1B. **Roof Assembly —** As an alternate to Items 1 and 1A, a fire rated protected fluted steel deck roof assembly may be used. The roof assembly shall be constructed of the materials and in the manner described i the individual P700 Series Roof-Ceiling Design in the UL Fire Resistance Directory. The hourly rating of the roc assembly shall be equal to or greater than the hourly rating of the wall assembly. The roof assembly shall include the following construction features:

   A. **Steel Roof Deck —** Max 3 in. (76 mm) deep galv steel fluted roof deck.

   B. **Spray—Applied Fire Resistive Materials* —** (Not Shown)—Prior to the installation of the steel ceiling runners, Forming Material and Fill, Void or Cavity Material (Items 2A, 3A, 3B), the roof assembly shall be sprayed with the type and thickness of fire resistive material indicated in the individual P700 Series design.

2. **Wall Assembly —** Min 6 in. (152 mm) thick steel-reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m^3) structural concrete. Wall may also be constructed of any UL Classified **Concrete Blocks***.

   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

3. **Joint System — Max separation between bottom of floor or roof and top of wall at time of installation of joint system is 1 in (25 mm) . The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width.** The joint system shall consist of the following:

   A. **Forming Material —** Nom 4 pcf (64 kg/m^3) mineral wool batt insulation compressed and firmly packed to completely fill the flutes and the gap between the top of the wall and bottom of the floor or roof as a permanent form. Batt insulation cut to the shape of the fluted steel deck, approx 33 percent larger than the flutes. Pieces compressed and installed vertically into the flutes above the top of the wall. Additional pieces of batt insulation, min 6 in. wide, installed edge-first into joint opening between bottom of fluted steel deck and top of wall, parallel with joint direction, such that batt sections are compressed min 33 percent in thickness. Compressed batt sections are flush with both surfaces of wall. Adjoining lengths of batt to be tightly butted with butted seams spaced min 48 in. (1.22 m) apart along the length of the joint.

   ROCK WOOL MANUFACTURING CO — Delta Board

   A1. **Forming Material*—Plugs —** (Optional-Not Shown) Performed mineral wool plugs, formed to the shape of the fluted floor units, friction fit to completely fill the flutes above the ceiling runner. The plugs shall be flush with both wall surfaces. Additional forming material, described in Item 3A, to be used in conjunction with the plugs to fill the gap between the top of the wall and the bottom of the steel floor units.

   HILTI CONSTRUCTION CHEMICALS, DIV OF

   HILTI INC — CP777 Speed Plugs

   B. **Fill, Void or Cavity Material* —** Min 1/8 in. (3.2 mm) wet thickness (min 1/16 in. or 1.6mm dry thickness) of fill material sprayed or troweled on each side of the wall to completely cover mineral wool forming material and to overlap a min of 1/2 in. (13 mm) onto wall and steel deck on both sides of wall. When spray-applied fire resistive material* is applied to the steel deck, the fill material is to overlap the wall a min of 1/2 in. (14 mm) and to overlap the spray-applied fire resistive material a min of 2 in. (51 mm) on both sides of wall. When through-penetrants (Item 4) are installed within flute, the fill material shall overlap a min 1/2 in. (13 mm) onto the periphery of each penetrant, on both sides of wall.

   HILTI CONSTRUCTION CHEMICALS, DIV OF

   HILTI INC — CP672 Firestop Spray or CFS-SP WB Firestop Joint Spray

4. **Through-Penetrants —** Max of two penetrants may be installed parallel with and within the flutes of the steel floor or roof deck. The annular space between penetrants and steel deck or spray-applied fire resistive material on steel deck shall be min 0 in. (point contact) and the annular space between penetrants within the flute shall be min 2 in. (51 mm). Penetrants to be rigidly supported on both sides of the floor or wall assembly The following types and sizes of penetrants may be used:

   A. **Polyvinyl Chloride (PVC) Pipe —** Nom 1-1/2 in. (38 mm) diam (or smaller) Schedule 40 solid core PVC pipe for use in closed (process or supply) piping systems.

   B. **Rigid Nonmetallic Conduit+ —** Nom 1-1/2 in. (38 mm) diam (or smaller) Schedule 40 PVC conduit installed in accordance with the National Electrical Code (NFPA 70).

   C. **Steel Conduit or Tubing —** Nom 1/2 in. (13 mm) diam rigid steel conduit or steel electrical metallic tubing (EMT) installed in accordance with the National Electrical Code (NFPA No. 70).

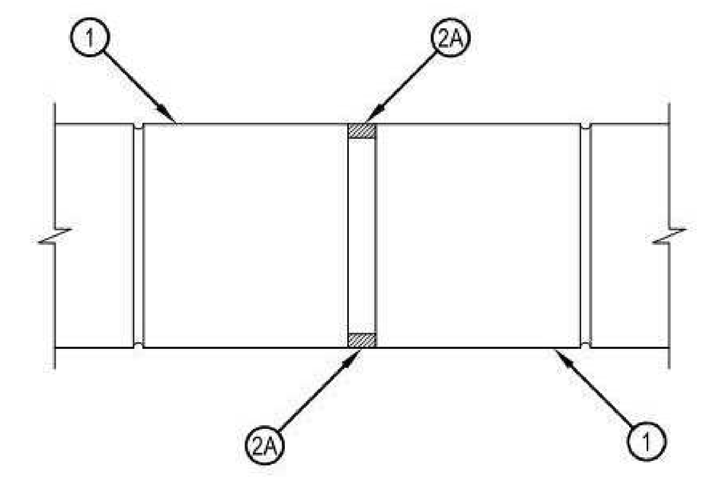
   When Through-Penetrant(s) installed in flute of steel deck, the hourly rating of the joint system is 1 hr.

   When Through-Penetrant(s) installed in flute of steel deck, L Ratings do not apply.

*Bearing the UL Classification Mark

System No. WW-D-0032

Assembly Rating - 3Hr
Nominal Joint Width - 1 in.
L Rating At Ambient — Less Than 1 CFM/Lin Ft
L Rating At 400°F — Less Than 1 CFM/Lin Ft
Class II Movement Capabilities - 12.5% Compression and Extension

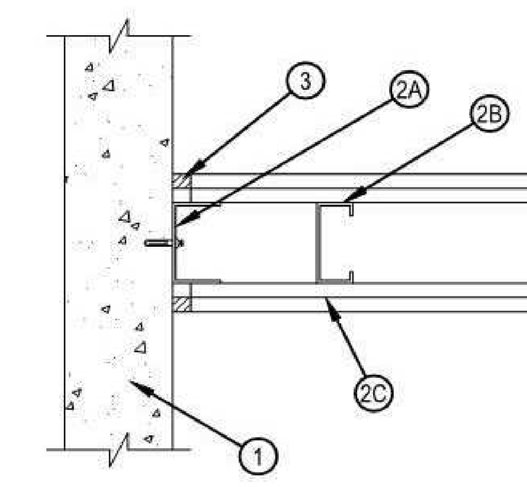


1. Wall Assembly — Min 8 in. (203 mm) thick steel reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Joint System — Max width of joint (at time of installation) is 1 in. (25 mm). The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system shall consists of the following:
   A. Fill, Void or Cavity Material* - Sealant — A 1/2 in. (13 mm) thickness of fill material installed within the joint, flush with each surface of the wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant
   B. Forming Material — (Optional, Not Shown) - Mineral wool insulation or polyurethane foam backer rod. Forming material to be recessed from both surfaces of the wall as required to accommodate the required thickness of fill material.

*Bearing the UL Classification Mark

System No. WW-D-0040

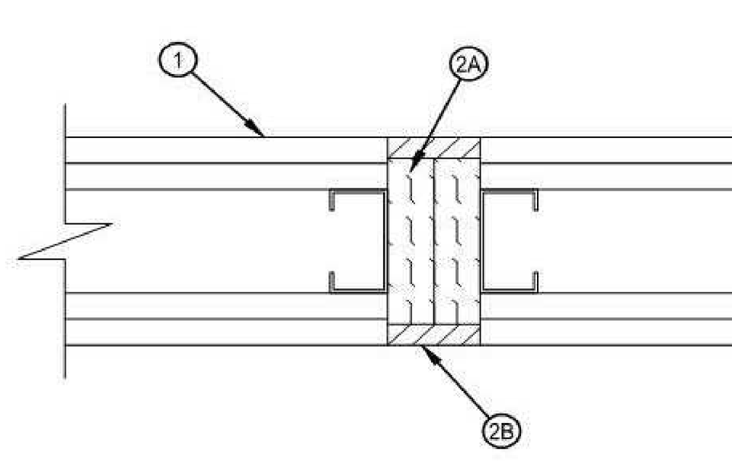
Assembly Rating — 1 and 2 Hr (See Item 1)
Nominal Joint Width — 3/4 in.
L Rating At Ambient — Less Than 1 CFM/Lin Ft (See Item 3)
L Rating At 400°F — Less Than 1 CFM/Lin Ft (See Item 3)
Class II Movement Capabilities — 17 Percent Compression or Extension



1. Concrete Wall Assembly — Min 4-1/2 in. (114 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) structural concrete. Wall may also be constructed of any UL Classified Concrete Blocks*.
   See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.
2. Gypsum Wall Assembly — The 1 or 2 h fire-rated gypsum board/steel stud wall assembly shall be constructed of the materials and in the manner specified in the individual U400 Series Wall and Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Steel Runners — Runners of wall assembly shall consist of min No. 25 gauge galv steel channels sized to accommodate steel studs (Item 2B). Runner to be provided with 1-1/4 in. (32 mm) flanges. Runner secured to concrete wall assembly with steel concrete fasteners spaced 12 in. (305 mm) OC.
   B. Studs — Steel studs to be min 3-1/2 in. (89 mm) wide. Studs cut 1/2 to 3/4 in. (13 to 19 mm) less in length than assembly height with bottom nesting in and resting on floor runner and with top nesting in ceiling runner without attachment. First stud adjacent to concrete wall assembly located max 4 in. (102 mm) from wall face. Stud spacing not to exceed 24 in. (610 mm) OC.
   C. Gypsum Board* — For 1 hr assembly, one layer of 5/8 in. (16 mm) thick gypsum board is required in the individual Wall and Partition Design. For 2 hr assembly, two layers of 5/8 in. (16 mm) thick gypsum board are required in the individual Wall and Partition Design. Wall to be constructed as specified in the individual U400 Series Design in the UL Fire Resistance Directory, except that a max 3/4 in. (19 mm) gap shall be maintained between the side of gypsum board and face of concrete wall assembly. The screws attaching the gypsum board to the first stud shall be located 4 in. (102 mm) from face of concrete wall assembly. Gypsum board not attached to side runner. The hourly fire rating of the joint system is equal to the hourly rating of the gypsum wall assembly.
3. Fill, Void or Cavity Material* Sealant — Max separation between side of gypsum board and face of concrete wall assembly is 3/4 in. (19 mm). The joint system is designed to accommodate a max 17 percent compression or extension from its installed width. Min 5/8 in. (16 mm) thickness of fill material installed on each side of the wall between the side of the gypsum board and the face of the concrete wall assembly, flush with each surface of the gypsum wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S Elastomeric Firestop Sealant or CP606 Flexible Firestop Sealant. L Ratings apply only when CP606 Sealanbt is used.

System No. WW-D-0067

Assembly Ratings — 1 and 2 (See Item 1)
Nominal Joint Width — 2 in.
Class II Movement Capabilities — 12.5% Compression or Extension



1. Wall Assembly — Nonbearing 1 or 2 hr fire rated gypsum board/steel stud assembly constructed of the materials and in the manner described in the individual U400 or V400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:
   A. Studs — Min 1-1/2 in. (38 mm) wide steel studs spaced max 24 in. (610 mm) OC.
   B. Gypsum Board* — The gypsum board type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U400 or V400 Series Design in the UL Fire Resistance Directory.
   The hourly assembly rating of the joint system is equal to the hourly fire rating of the wall assembly in which it is installed.
2. Joint System — Max width of joint (at time of installation of joint system) is 2 in. (51 mm) The joint system is designed to accommodate a max 12.5 percent compression or extension from its installed width. The joint system shall consist of the following:
   A. Forming Material* — Min 4.0 pcf (64 kg/m3) mineral wool batt insulation installed in joint opening as a permanent form. Pieces of batt cut to min width of 1-3/4 or 3 in. (44 or 76 mm) for 1 and 2 hr rated assemblies, respectively. Pieces of batt installed edge-first into joint opening, parallel with joint direction, such that batt sections are compressed min 50 percent in thickness and such that the compressed batt sections are recessed from both surfaces of wall to accommodate the required thickness of fill material.
   FIBREX INSULATIONS INC — FBX Safing Insulation
   B. Fill, Void or Cavity Material* - Sealant — Min 1/2 in. (13 mm) thickness of fill material applied within the joint, flush with both surfaces of wall.
   HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP606 Flexible Firestop Sealant

*Bearing the UL Classification Mark

DLR Group
© DLR Group

SWI Shepherd | Wesnitzer Inc

NORRIS DESIGN

NAU NORTHERN ARIZONA UNIVERSITY

Northern Arizona University - Student Athlete High Performance Center, Building 73A

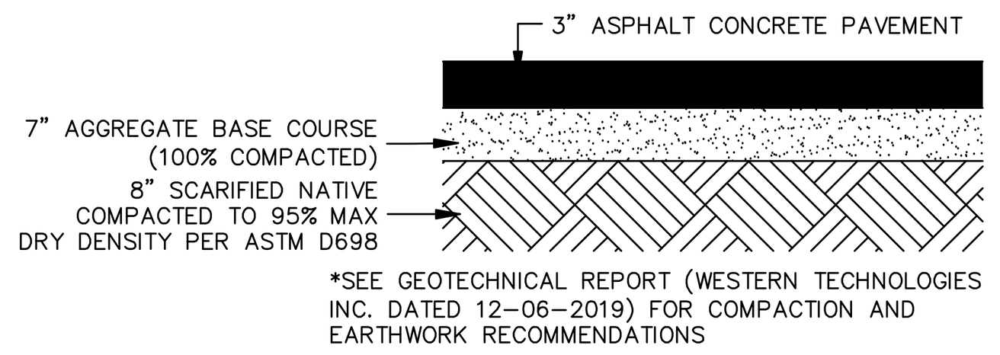
NAU Project: 09 731-191
1650 S. San Francisco Street, Flagstaff Arizona 86011 (SAHPC-73A)

CONSTRUCTION DOCUMENTS
06.22.2020
Revisions

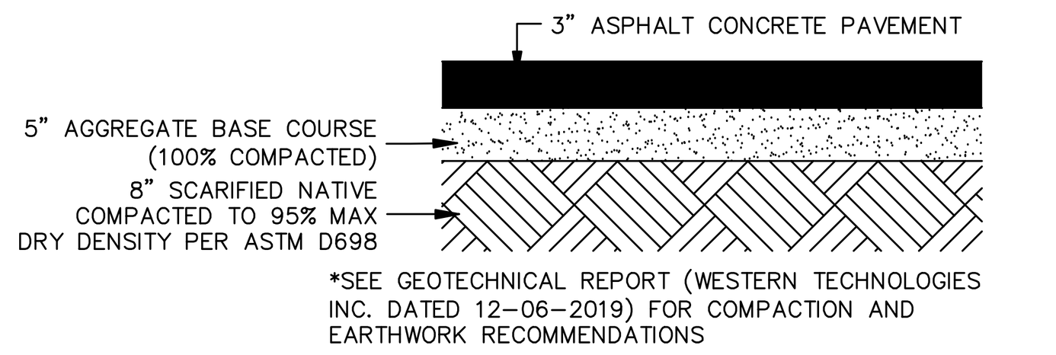
30-19131-00

TESTED ASSEMBLIES

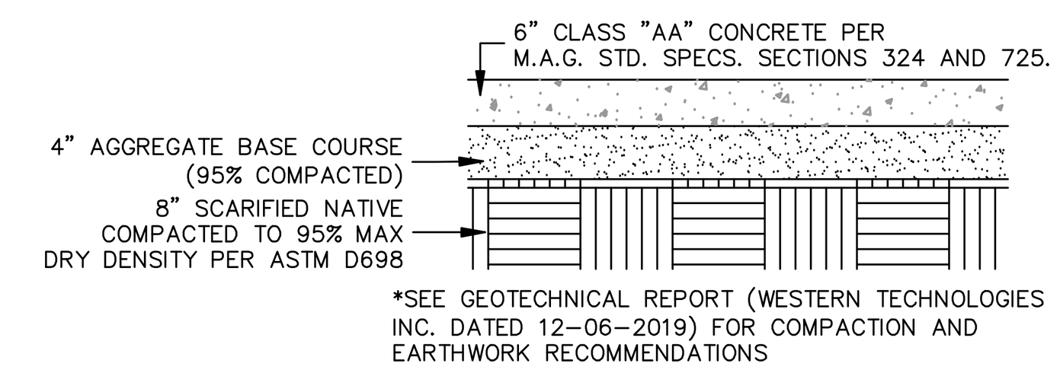
CP2.4



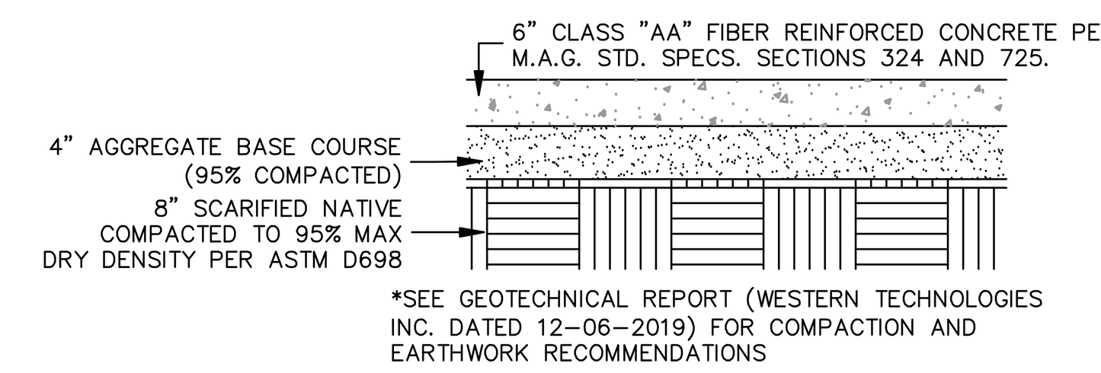
A ASPHALTIC PAVEMENT SECTION HEAVY DUTY N.T.S.



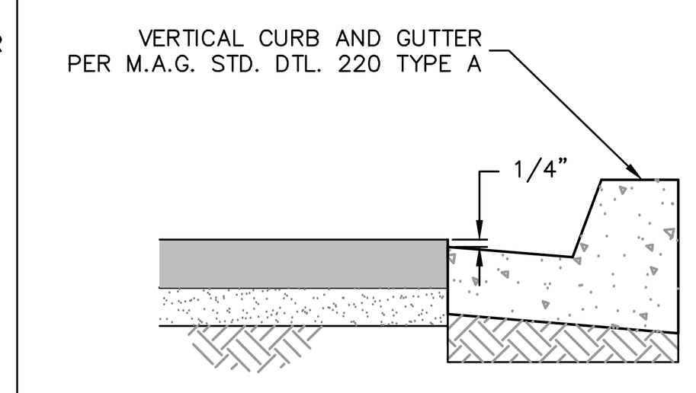
B ASPHALTIC PAVEMENT SECTION LIGHT DUTY N.T.S.



C CONCRETE PAVEMENT SECTION N.T.S.



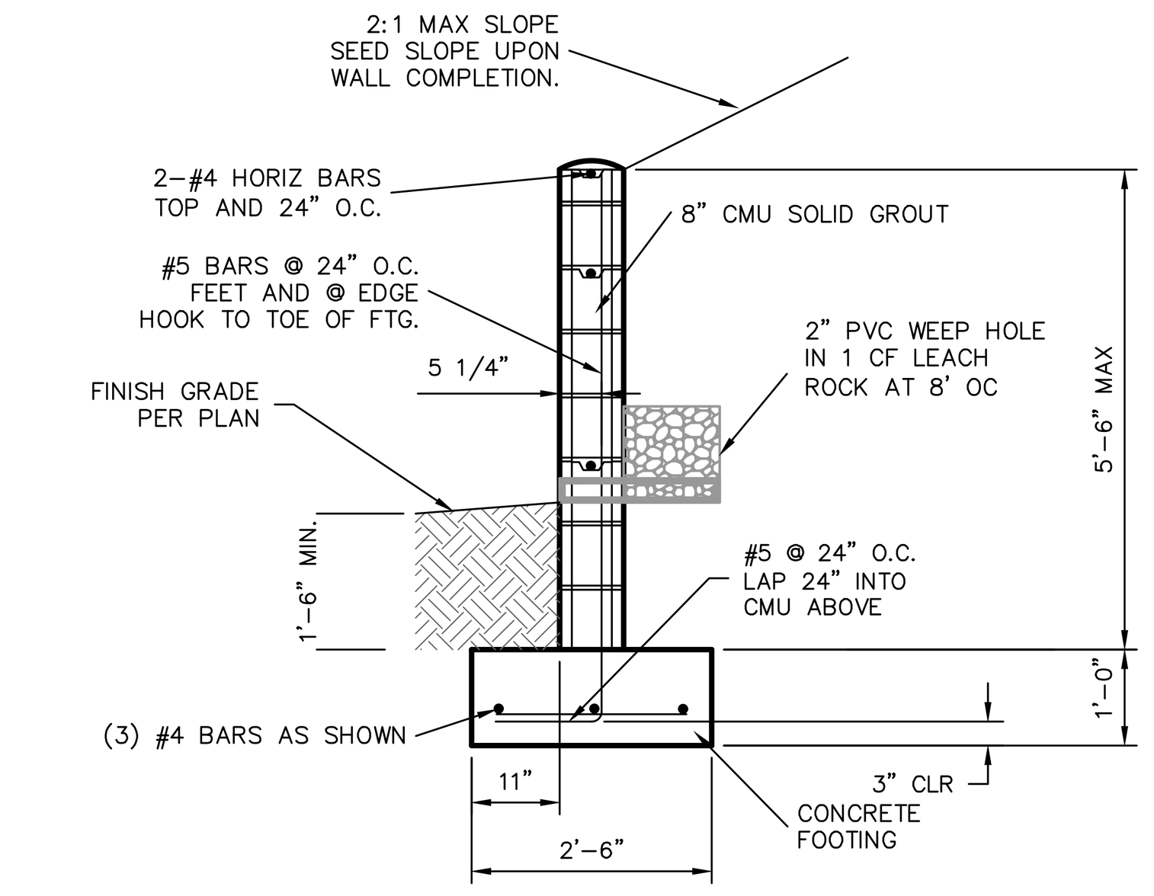
D CONCRETE SIDEWALK SECTION N.T.S.



NOTES:
1. CONCRETE SHALL HAVE 5% TO 7% AIR ENTRAINMENT.
2. CONCRETE SHALL BE CLASS "A" IN ACCORDANCE WITH M.A.G. SPEC. SEC. 725.
3. WHEN ADJACENT PAVEMENT SECTION SLOPES AWAY FROM THE GUTTER, THE SLOPE OF THE GUTTER PAN SHALL MATCH THE PAVEMENT CROSS SLOPE.

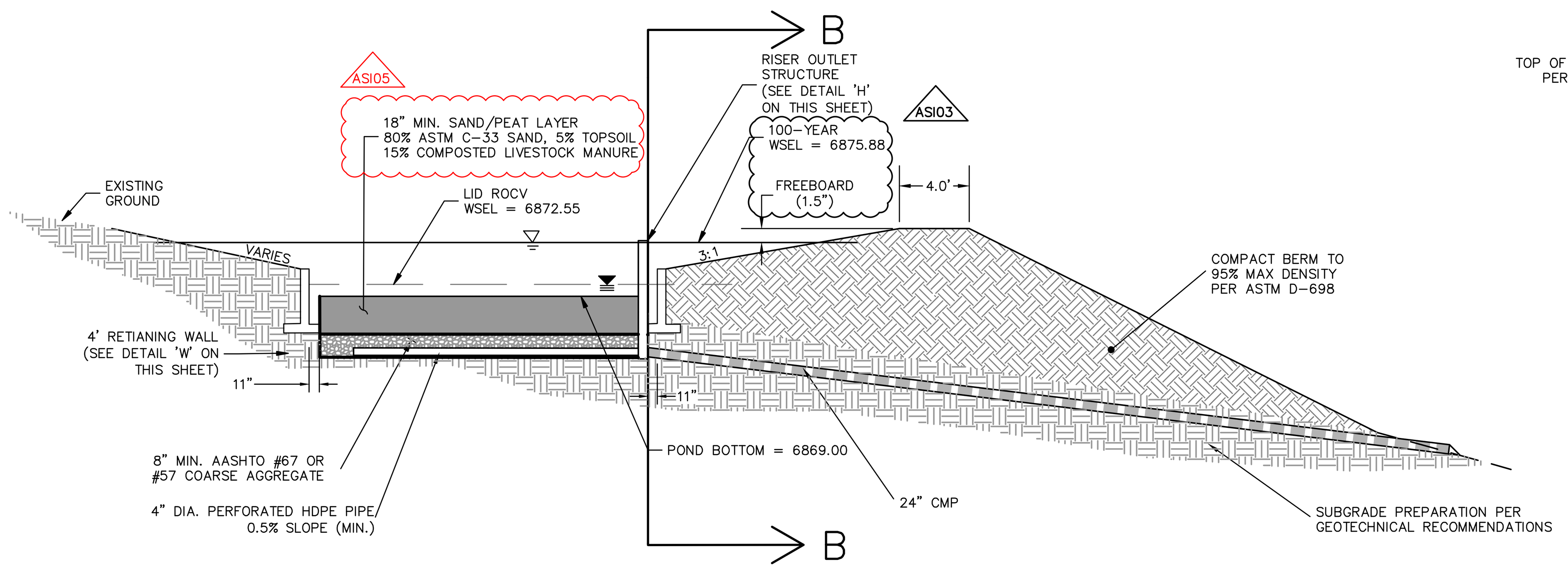
*SEE GEOTECHNICAL REPORT (WESTERN TECHNOLOGIES, INC. DATED 12-06-2019) FOR COMPACTION AND EARTHWORK RECOMMENDATIONS

E VERTICAL CURB AND GUTTER N.T.S.

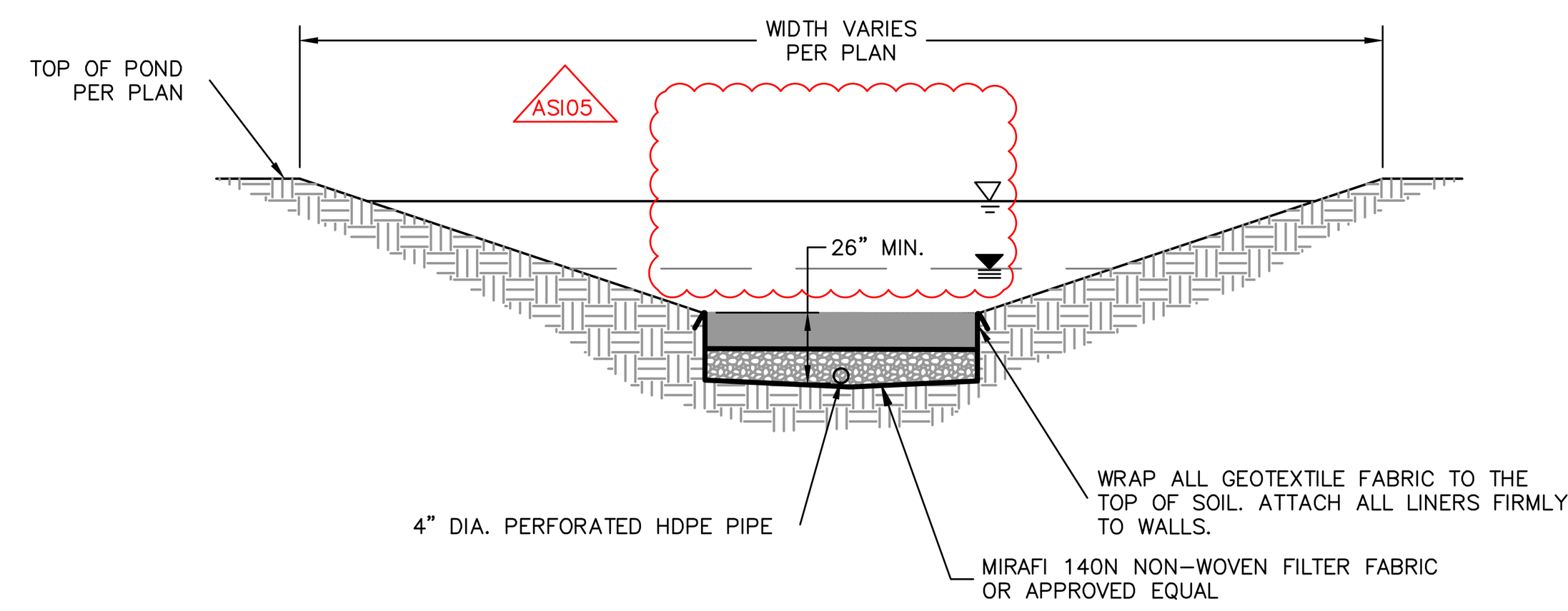


NOTES:
1. SEE GEOTECHNICAL REPORT FOR SUBGRADE AND BEARING REQUIREMENTS.

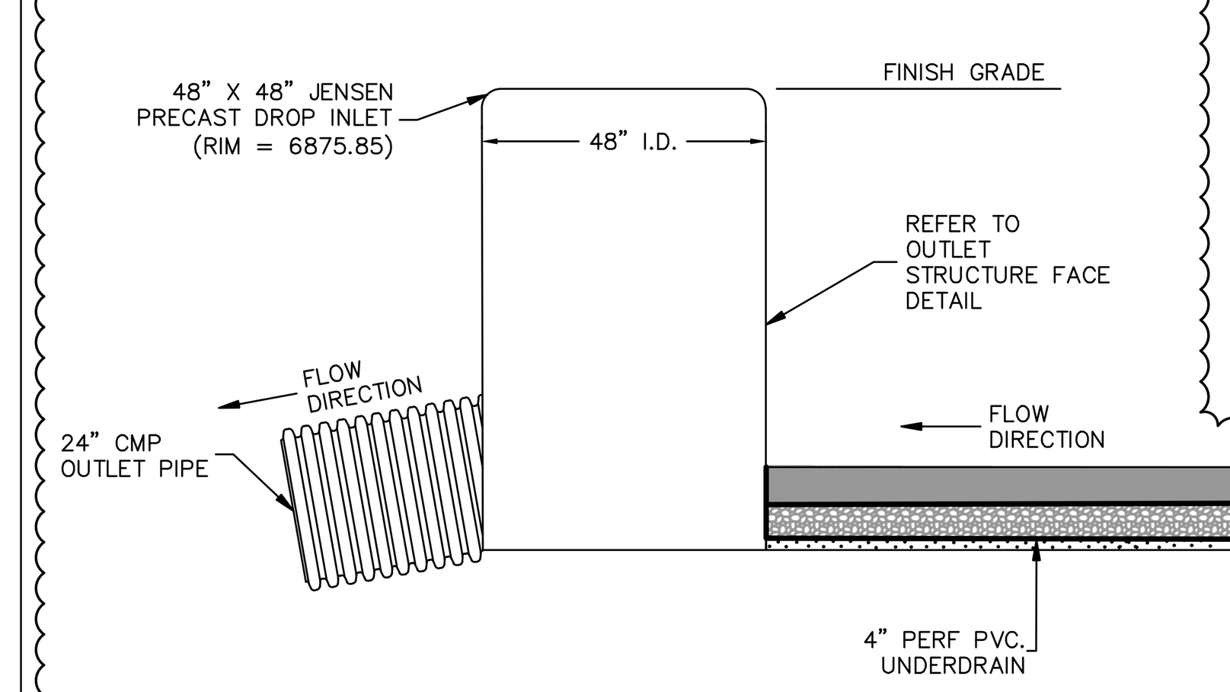
W POND RETAINING WALL N.T.S.



G POND 1 DETAIL N.T.S.

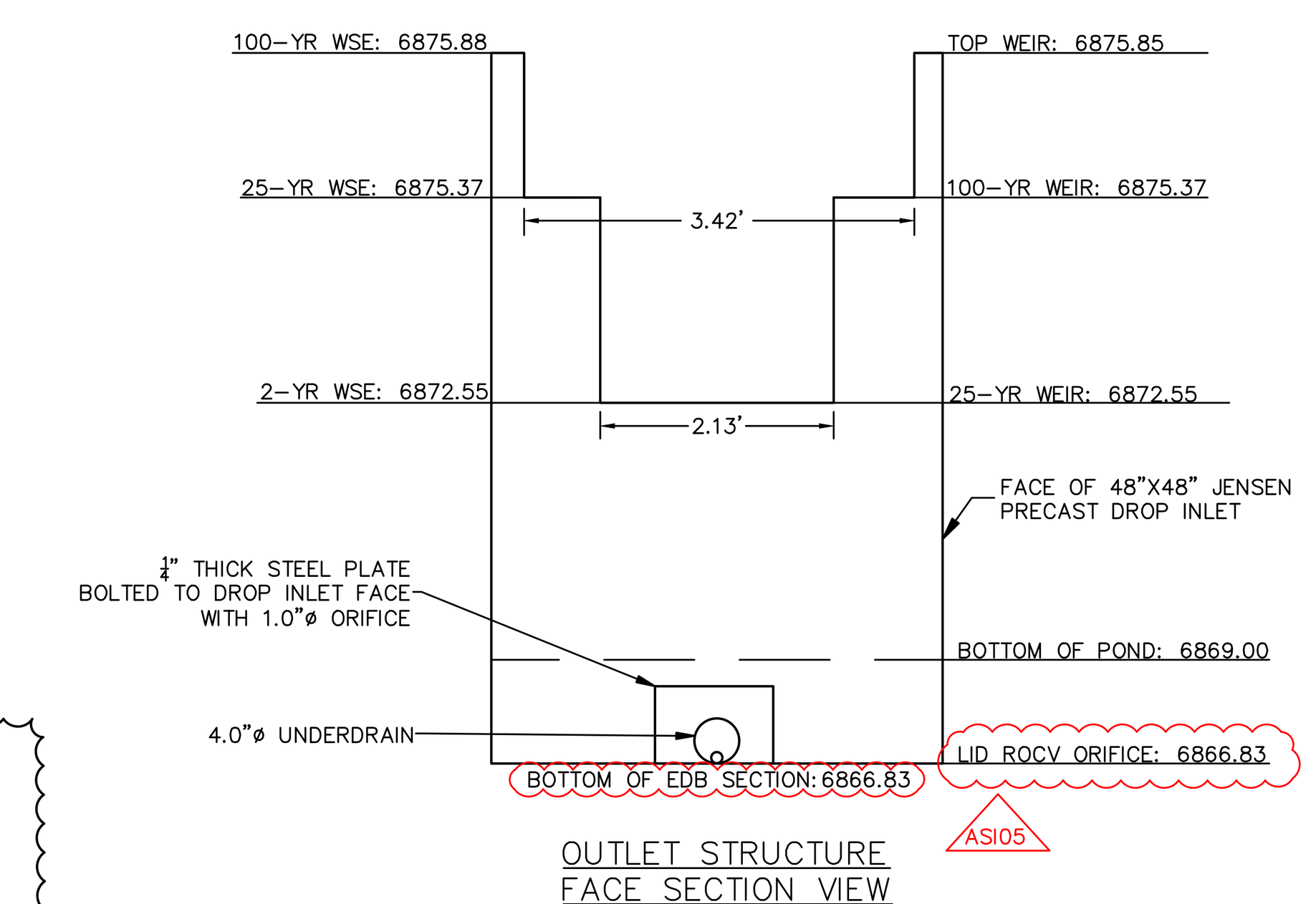


CROSS-SECTION B-B



H OUTLET STRUCTURE N.T.S.

ASI03



OUTLET STRUCTURE FACE SECTION VIEW

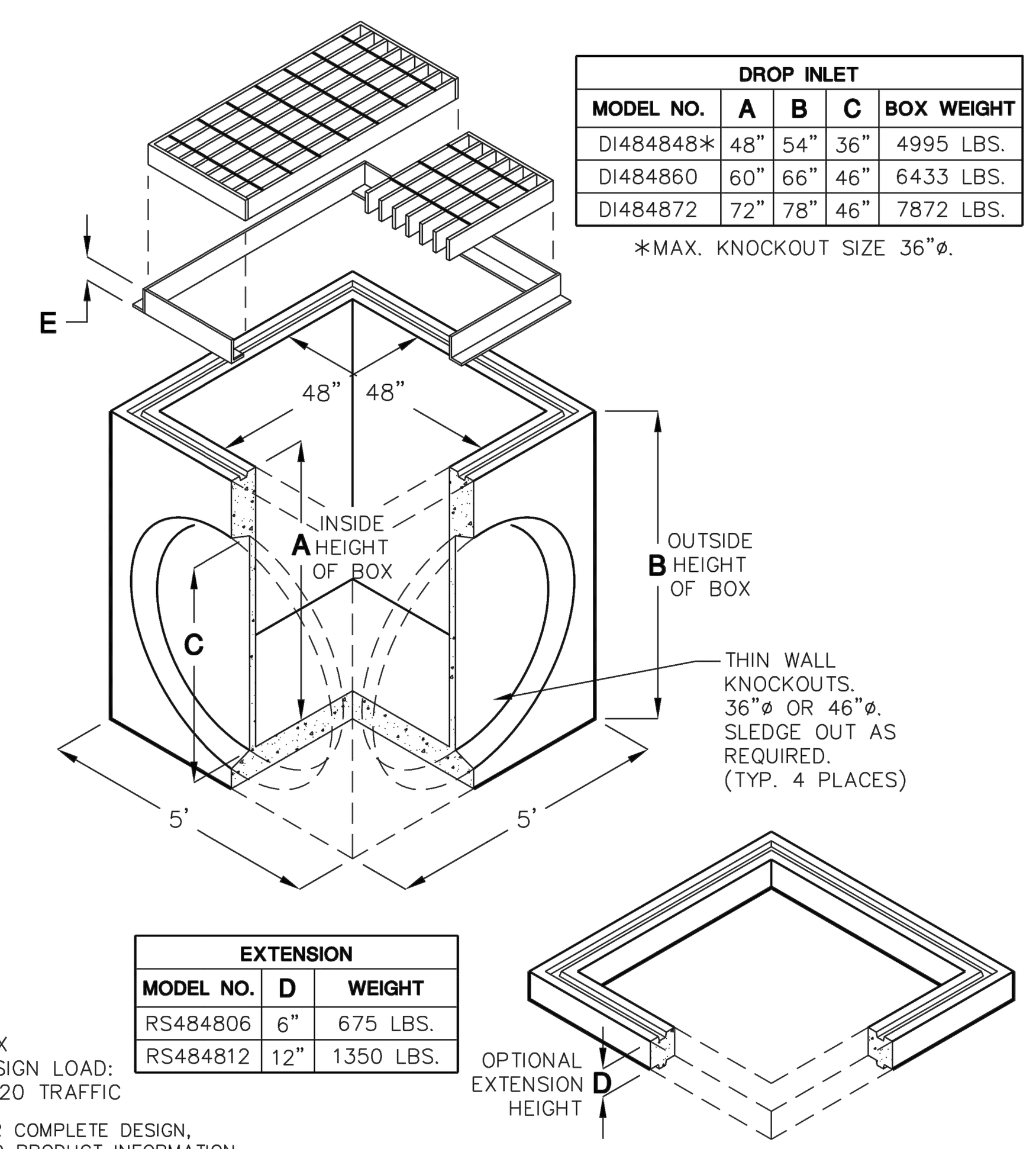
48"x48" DROP INLET

UP TO 6'-0" INSIDE DEPTH

FRAME AND GRATE			
MODEL NO.	RATING	E	WEIGHT
FG4848P	PEDESTRIAN	1 1/2"	242 LBS.
FG4848I	TRAFFIC	5"	1000 LBS.

DROP INLET				
MODEL NO.	A	B	C	BOX WEIGHT
DI484848*	48"	54"	36"	4995 LBS.
DI484860	60"	66"	46"	6433 LBS.
DI484872	72"	78"	46"	7872 LBS.

*MAX. KNOCKOUT SIZE 36"Ø.



EXTENSION		
MODEL NO.	D	WEIGHT
RS484806	6"	675 LBS.
RS484812	12"	1350 LBS.

BOX DESIGN LOAD: H-20 TRAFFIC

FOR COMPLETE DESIGN, AND PRODUCT INFORMATION, CONTACT JENSEN PRECAST.

8/31/00
DI4848.dwg
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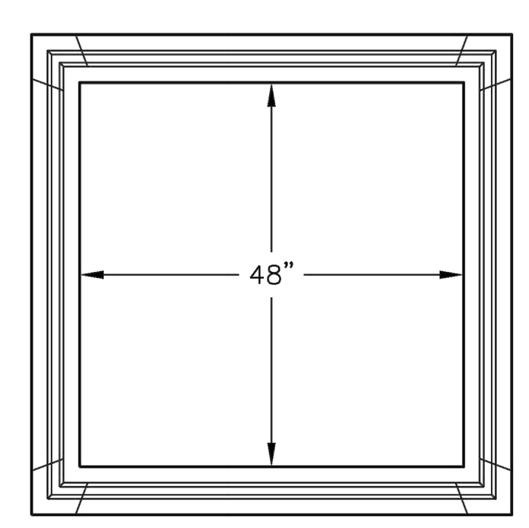
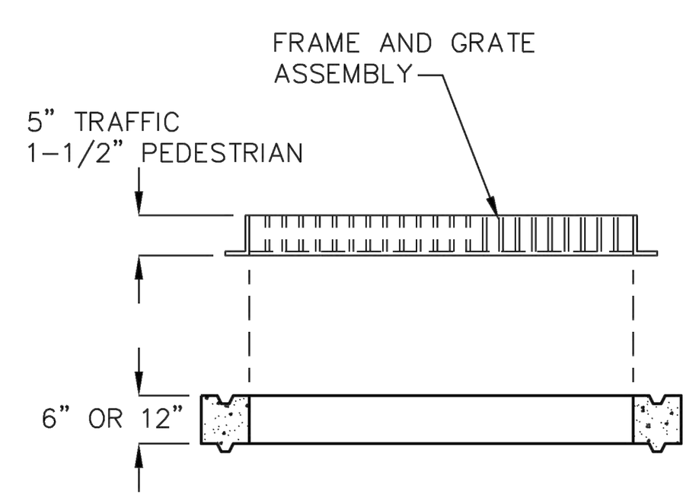
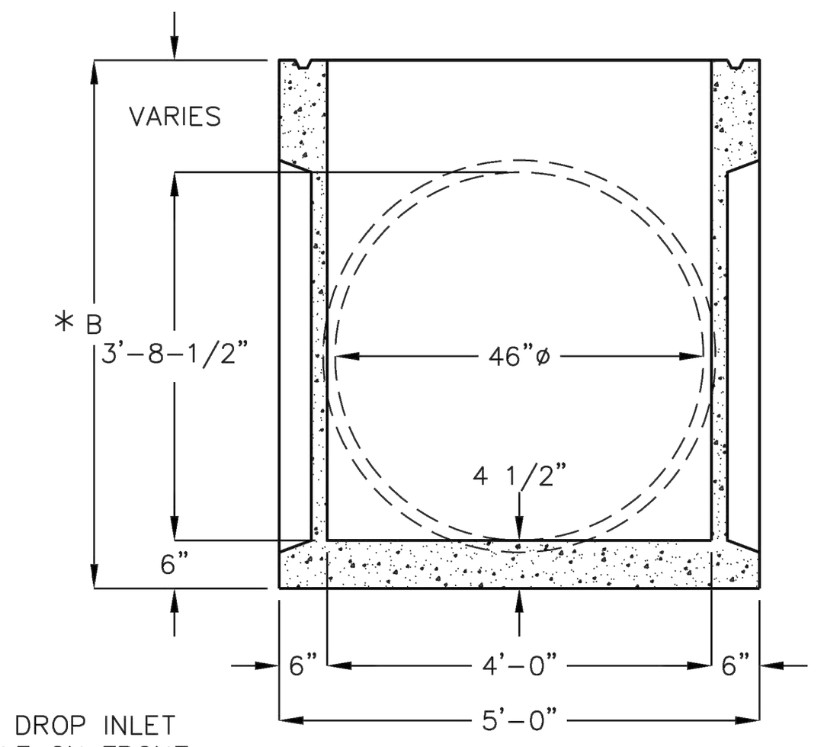
JENSEN PRECAST



TOP VIEW-BOX WITH FRAME AND GRATE REMOVED



EXTENSION WITH LOOSE FRAME AND GRATE SHOWN



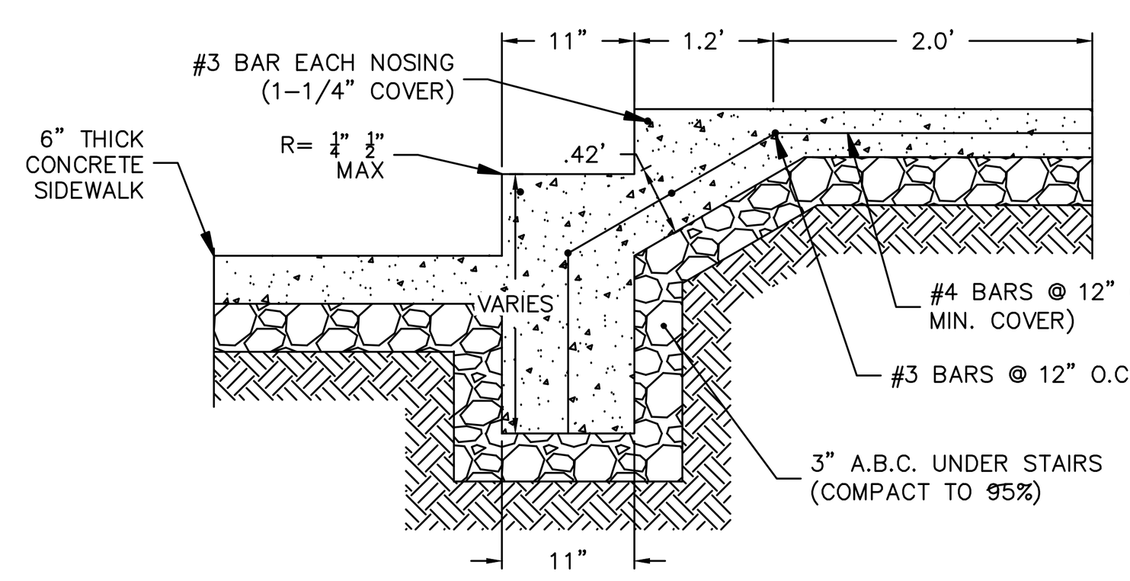
* SEE DROP INLET TABLE ON FRONT

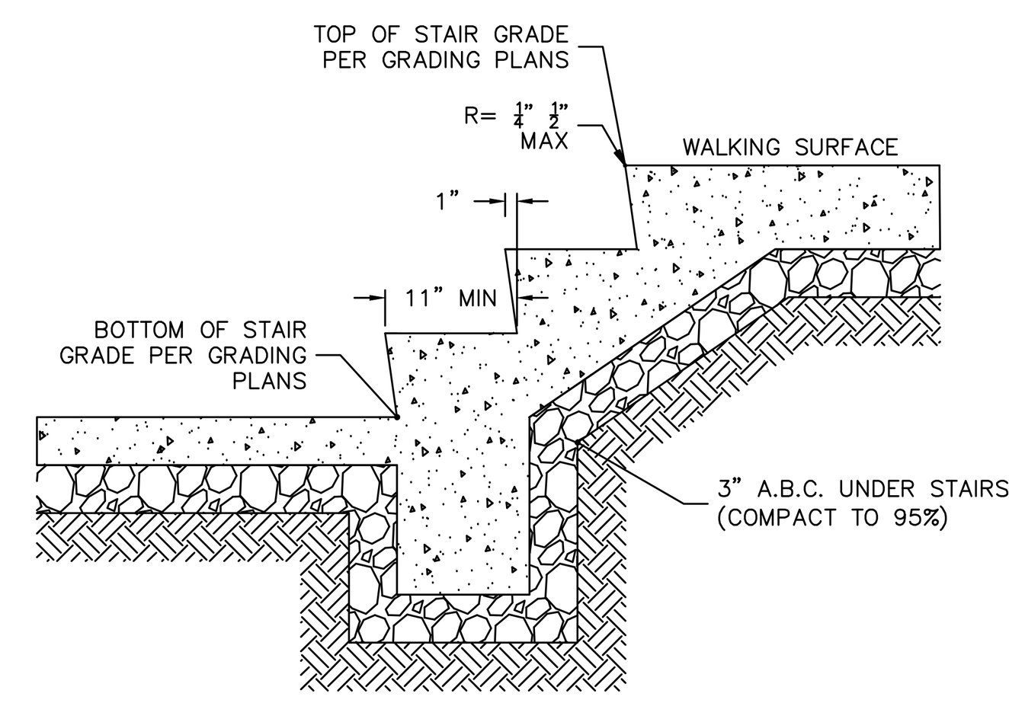
SECTION 48"x48" DROP INLET

JENSEN PRECAST

8/31/00

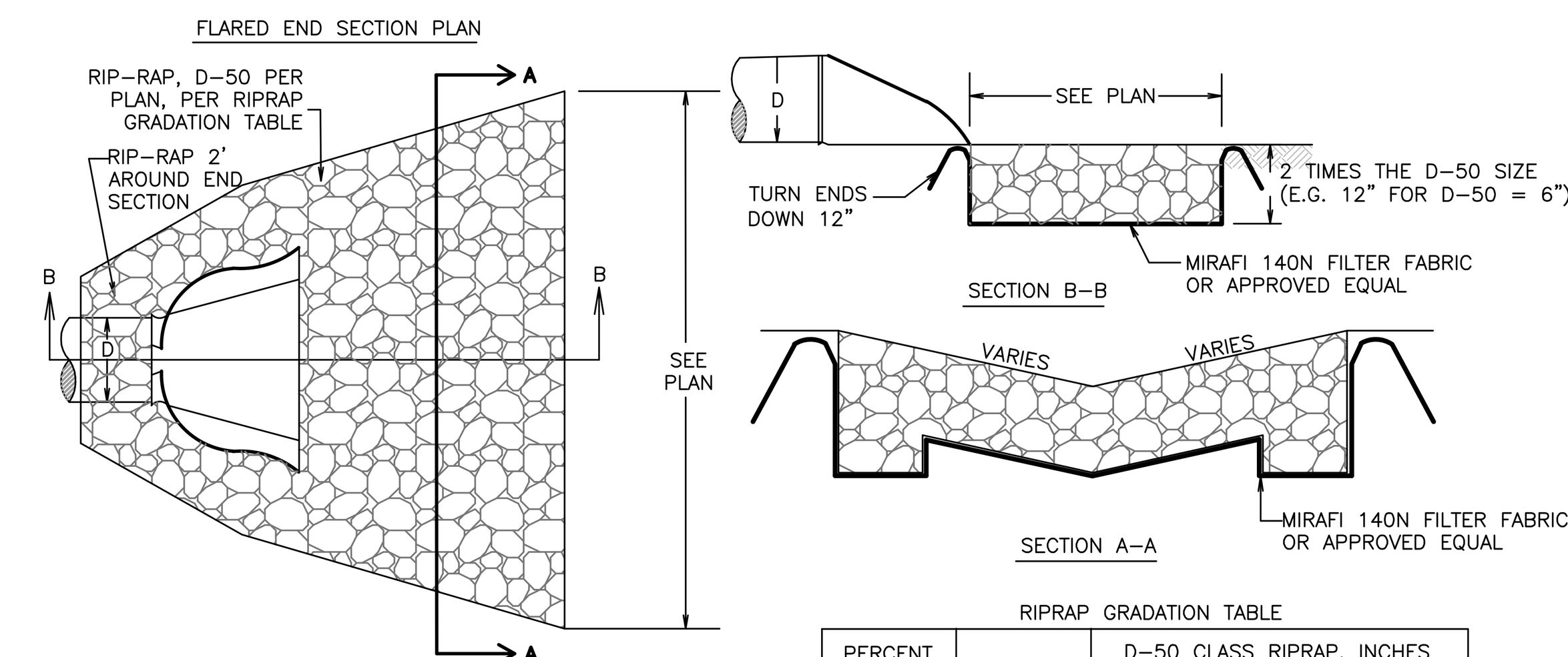
REBAR PLACEMENT





STAIR PROFILE

S TYPICAL STAIR DETAIL N.T.S.

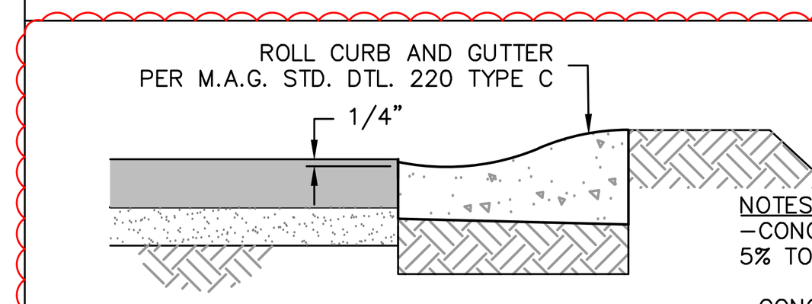


RIPRAP GRADATION TABLE

PERCENT PASSING	SIZE	D-50 CLASS RIPRAP, INCHES						
		6	9	12	18	24	36	30
100 to 90	2.0 D-50	12	18	24	36	48	72	60
85 to 70	1.5 D-50	9	14	18	27	36	54	45
50 to 30	1.0 D-50	6	9	12	18	24	36	30
15 to 5	0.67 D-50	4	6	8	12	16	24	20
5 to 0	0.33 D-50	2	3	4	6	8	12	10

RIPRAP
-RIPRAP SHALL HAVE A BULK SPECIFIC GRAVITY OF 2.4 OR GREATER (PER ASTM C127) AND ALL ROCK SHALL BE ANGULAR
-RIPRAP SHALL BE BETWEEN 3-INCHES AND 12-INCHES IN DIAMETER, WITH 50% (BY WEIGHT) LARGER THAN 6-INCHES IN DIAMETER UNLESS OTHERWISE SPECIFIED BY THE CITY ENGINEER

R RIPRAP INSTALLATION DETAIL



NOTES:
-CONCRETE SHALL HAVE 5% TO 7% AIR ENTRAINMENT.
-CONCRETE SHALL BE CLASS "A" IN ACCORDANCE WITH M.A.G. SPEC. SEC. 725.

*SEE GEOTECHNICAL REPORT (WESTERN TECHNOLOGIES, INC. DATED 12-06-2019) FOR COMPACTION AND EARTHWORK RECOMMENDATIONS

T ROLL CURB AND GUTTER N.T.S.

ASI05

DLR Group

SWI Shepherd | Wesnitzer Inc
NORRIS DESIGN

NAU NORTHERN ARIZONA UNIVERSITY

Northern Arizona University - Student Athlete High Performance Center, Building 73A

NAU Project: 09.731.191
1650 S. San Francisco Street, Flagstaff Arizona, 86011 (SAHPC-73A)

CONSTRUCTION DOCUMENTS
6.22.2020
Revisions
ASI03 09.04.20 TRADES, AHJ REVS
ASI05 10.07.20 TRADES, AHJ REVS

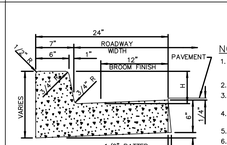
Attachment C1 to ASI05 dated 10/07/20

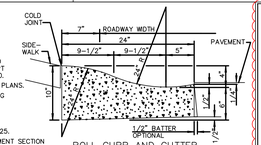
30-19131-00

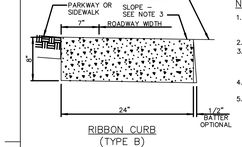
CIVIL DETAILS

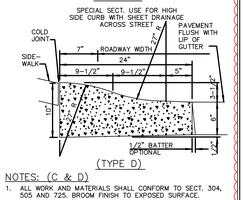
DT01

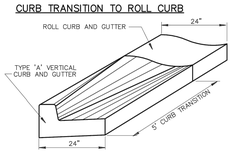
File location
Timestamp

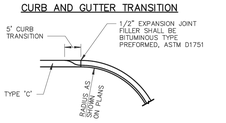


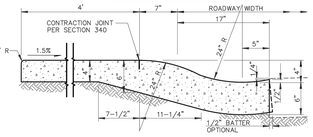


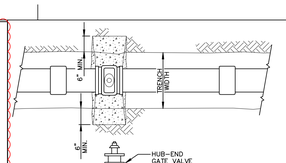


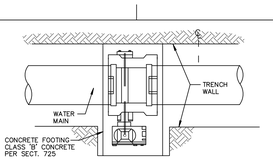


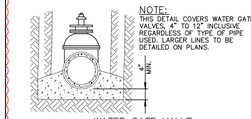


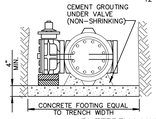


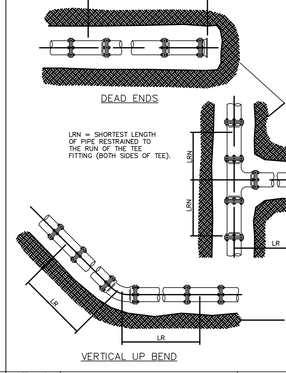


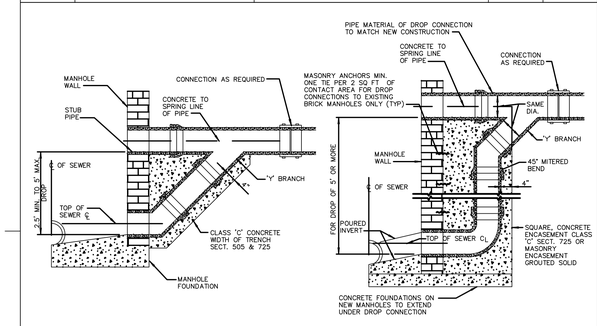


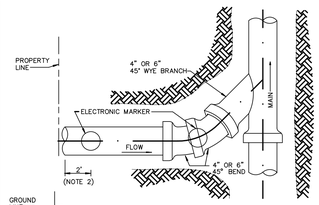


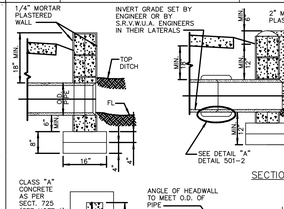


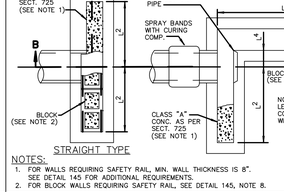


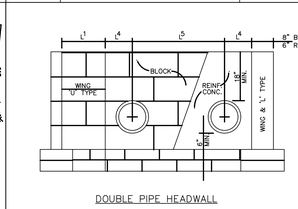


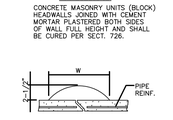


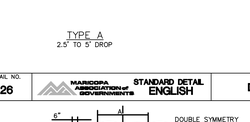


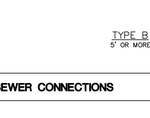


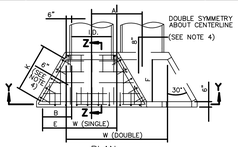


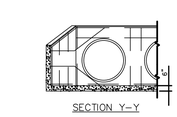


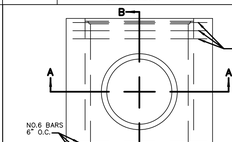


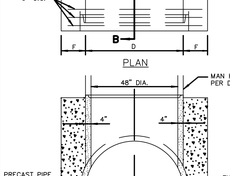


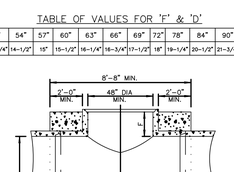


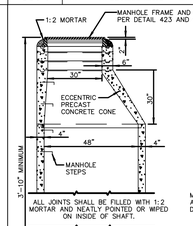


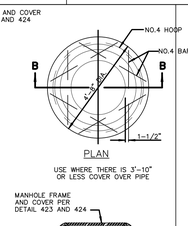


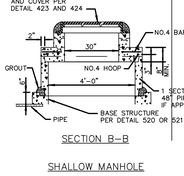


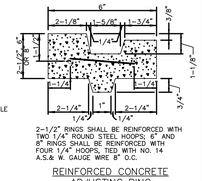


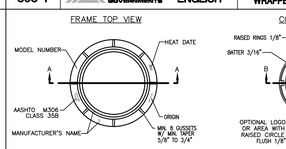


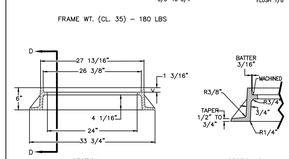












VERTICAL CURB AND GUTTER
(TYPE A)

NOTES: (TYPE A)
1. ALL EXPOSED SURFACES TO BE TROWEL FINISHED EXCEPT AS SHOWN. SEE SECT. 340.
2. H=6" OR AS SPECIFIED ON PLANS.
3. CONTRACTION JOINT SPACING 10' MAXIMUM.
4. EXPANSION JOINTS AS PER SECT. 340.
5. CLASS 'B' CONCRETE PER 725.
6. WHEN THE ADJACENT PAVEMENT SECTION SLOPES AWAY FROM THE GUTTER, THE SLOPE OF THE GUTTER PAN SHALL MATCH PAVEMENT CROSS SLOPE.

RIBBON CURB
(TYPE B)

NOTES: (TYPE B)
1. CONSTRUCT CURB AND INSTALL 1/2" MASTIC EXPANSION JOINTS, A.S.T.M. D-1751. SECT. 340.
2. BROOM FINISH ALL SURFACES.
3. RIBBON CURB MAY SLOPE TOWARDS PAVEMENT OR PARKWAY AS INDICATED ON PLANS.
4. CONTRACTION JOINT SPACING 10' MAXIMUM.
5. CONCRETE SHALL BE CLASS 'B' PER SECT. 725 AND INSTALLED PER SECT. 505.

ROLL CURB AND GUTTER
(TYPE C)

(TYPE D)

NOTES: (C & D)
1. ALL WORK AND MATERIALS SHALL CONFORM TO SECT. 304, 505 AND 725. BROOM FINISH TO EXPOSED SURFACE.
2. CONTRACTION JOINT SPACING 10' MAXIMUM.
3. EXPANSION JOINTS AS PER SECT. 340.
4. CLASS 'B' CONCRETE PER 725.

DETAIL NO. 220-1 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | CURB AND GUTTER TYPES A, B, C AND D | REVISED 01-01-2007 | DETAIL NO. 220-1

CURB TRANSITION TO ROLL CURB

NOTES: (CURB AND GUTTER TRANSITIONS)
1. TRANSITIONS WILL BE PAID FOR AS THE PREDOMINANT TYPE OF CURB AND GUTTER BEING TRANSITIONED. WHEN TYPE 'A' CURB AND GUTTER ARE USED AT CURB RETURNS AND TYPE 'C' CURB AND GUTTER IS PREDOMINANTLY USED ELSEWHERE, THE TYPE 'A' TO TYPE 'C' TRANSITION SHALL BE MEASURED AND PAID FOR AS TYPE 'C' CURB AND GUTTER.
2. WHERE PROPOSED CONSTRUCTION IS TO BE CONNECTED TO EXISTING CURB AND GUTTER, THE TRANSITION SHALL BE INDICATED ON PLANS.
3. CLASS 'B' CONCRETE PER SECTION 725.
4. TRANSITION BETWEEN TYPICAL SECTIONS SHALL BE ACCOMPLISHED BY THE USE OF DIRECT STRAIGHT LINE TRANSITIONS OF THE FLOW LINE AND OTHER SURFACE FEATURES.

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CURB AND GUTTER TRANSITION

INTEGRAL ROLL CURB, GUTTER AND SIDEWALK

NOTES: (INTEGRAL ROLL CURB, GUTTER AND SIDEWALK)
1. CONCRETE TO BE MONOLITHIC POUR. EXPOSED SURFACE FINISH AS PER SIDEWALK AND GUTTER DETAIL.
2. CONTRACTION JOINT SPACING 5' MAXIMUM.
3. EXPANSION JOINTS PER SECTION 340.
4. CLASS 'B' CONCRETE PER SECTION 725.

DETAIL NO. 221 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | CURB AND GUTTER TRANSITION AND INTEGRAL ROLL CURB, GUTTER AND SIDEWALK | DRAFT 01-01-2018 | DETAIL NO. 221

CLASS 'C' CONCRETE AS PER SECT. 725
FORM AS REQUIRED TO KEEP CLEAR OF JOINTS.

NOTE:
THIS DETAIL COVERS WATER GATE VALVES, 4" TO 12" INCLUSIVE REGARDLESS OF TYPE OF PIPE USED. LARGER LINES TO BE DETAILED ON PLANS.

WATER GATE VALVE

BUTTERFLY VALVE

NOTES:
1. THIS DETAIL COVERS BUTTERFLY VALVE INSTALLATION, 3" TO 12" INCLUSIVE, REGARDLESS OF TYPE OF PIPE OR JOINT USED. LARGER LINES TO BE DETAILED ON PLANS.
2. VALVE BOX AND COVER REQUIRED PER DETAILS 270 AND 391.

DETAIL NO. 301 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | BLOCKING FOR WATER GATE AND BUTTERFLY VALVES | REVISED 01-01-1998 | DETAIL NO. 301

DETAIL NO. 303-1 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | JOINT RESTRAINT FOR DUCTILE IRON, POLYETHYLENE WRAPPED DUCTILE IRON AND PVC WATER PIPES | REVISED 01-01-2019 | DETAIL NO. 303-1

RESTRAINED LENGTHS, LR, FOR DUCTILE IRON PIPE

NOMINAL PIPE SIZE INCHES	HORIZONTAL BENDS			TEES		VERTICAL OFFSETS						DEAD ENDS
						90° BEND FITTINGS		45° BEND FITTINGS		22-1/2° BEND FITTINGS		
	90°	45°	22-1/2°	LRN=0'	LRN=10'	DOWN BEND	UP BEND	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
4	18	7	4	30	8	31	18	13	7	6	3	31
6	25	10	5	43	20	44	25	18	10	9	5	44
8	32	13	6	56	34	58	32	24	13	11	6	58
10	38	16	8	68	45	69	38	29	16	14	8	69
12	45	19	9	80	57	81	45	34	19	16	9	81
14	51	21	10	91	68	92	51	38	21	18	10	92
16	57	24	11	103	79	104	57	43	24	21	11	104
18	62	26	12	113	90	115	62	48	26	23	12	115
20	68	28	14	125	100	126	68	52	28	25	14	126
24	79	33	16	145	121	147	79	61	33	29	16	147

RESTRAINED LENGTHS, LR, FOR DUCTILE IRON WITH POLYETHYLENE WRAP AND PVC PIPE

NOMINAL PIPE SIZE INCHES	HORIZONTAL BENDS			TEES		VERTICAL OFFSETS						DEAD ENDS
						90° BEND FITTINGS		45° BEND FITTINGS		22-1/2° BEND FITTINGS		
	90°	45°	22-1/2°	LRN=0'	LRN=10'	DOWN BEND	UP BEND	DOWN BEND	UP BEND	DOWN BEND	UP BEND	
4	26	11	5	69	18	72	26	30	11	14	5	72
6	36	15	7	99	47	102	36	42	15	20	7	102
8	47	19	9	130	78	133	47	55	19	26	9	133
10	56	23	11	157	103	159	56	66	23	32	11	159
12	65	27	13	185	131	187	65	77	27	37	13	187
14	74	31	15	211	156	214	74	89	31	42	15	214
16	82	34	16	238	183	241	82	100	34	48	16	241
18	90	37	18	263	207	266	90	110	38	53	18	266
20	98	41	20	289	233	292	98	121	41	58	20	292
24	113	47	22	337	280	340	113	141	47	68	22	340

NOTES:
1. ALL JOINTS WITHIN THE SPECIFIED LENGTH LR MUST BE RESTRAINED. ALL LENGTHS ARE GIVEN IN FEET.
2. THE MAXIMUM TEST PRESSURE SHALL NOT EXCEED 200 PSI
3. THE MINIMUM DEPTH OF BURY SHALL BE 3' TO TOP OF PIPE.
4. RESTRAINED LENGTHS MAY BE REDUCED WHEN SUPPORTED BY ENGINEERING CALCULATIONS.

DETAIL NO. 303-2 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | JOINT RESTRAINT FOR DUCTILE IRON, POLYETHYLENE WRAPPED DUCTILE IRON AND PVC WATER PIPES | REVISED 01-01-2019 | DETAIL NO. 303-2

TYPE 'A' TOP
(PRECAST ECCENTRIC CONICAL TOP MANHOLE)

(PRECAST FLAT TOP M.H.)

NOTES:
1. PRECAST STEEL REINFORCED MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH ASTM C 478 EXCEPT AS MODIFIED HEREIN.
2. CAST-IN-PLACE MANHOLE BASE TO BE CONSTRUCTED IN ONE PLACEMENT.
3. CAST-IN-PLACE MANHOLE BASE SHELF AND CHANNEL TO RECEIVE SMOOTH TROWEL FINISH.
4. MANHOLE COATINGS PER AGENCY.
5. SEE MAG DETAIL 422 FOR FINAL ADJUSTMENT TO GRADE.
6. ANY MANHOLE OVER 20' SHALL REQUIRE ENGINEER (STRUCTURAL) CALCS.
7. THE MANHOLE ACCESS POINT SHALL BE ORIENTED IN SUCH A WAY THAT THE OPENING IS DIRECTLY ABOVE THE LOWEST INVERT, OR AS OTHERWISE DIRECTED BY THE PLANS OR ENG.
8. FOR PRECAST BASE SEE DETAIL 420-2.
9. FLAT TOPS SHALL ONLY BE USED WITH APPROVAL FROM THE ENGINEER.

DETAIL NO. 420-1 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | CONCRETE SANITARY SEWER MANHOLE | REVISED 01-01-2015 | DETAIL NO. 420-1

ADJUSTING RING DETAIL

SPACER TYPE	REQUIRED THICKNESS
BRICK	GREATER THAN 2"
4"X2" STEEL SPACER	½" TO 2"
GROUT	LESS THAN ½"

NOTES:
1. CONTRACTORS SHALL ADJUST ALL MANHOLE RINGS AND COVERS, INCLUDING MANHOLES OUTSIDE OF THE PAVEMENT.
2. ADJUSTMENT SHALL BE CONSTRUCTED PER MAG SECTION 345.
3. MANHOLE COATINGS PER AGENCY
4. GROUT SHALL BE USED BETWEEN FRAME AND ADJUSTING RING TO ACHIEVE WATER TIGHTNESS.

DETAIL NO. 422 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | MANHOLE FRAME AND COVER ADJUSTMENT | REVISED 01-01-2018 | DETAIL NO. 422

NOTE:
LETTERING ON MANHOLE COVER TO CONTAIN NAME OF AGENCY AND UTILITY FOR WHICH MANHOLE IS NEEDED, (I.E. "PHOENIX SANITARY SEWER"), OR AS DIRECTED. THE TOTAL WIDTH OF INDIVIDUAL LETTERS TO BE SUCH THAT LETTERS AND WORDS ARE EQUALLY SPACED AND BALANCED TO FORM A COMPLETE CIRCLE WITH SPACERS BEFORE AND AFTER THE WORD IDENTIFYING THE AGENCY INVOLVED. LETTERS TO BE 2" IN HEIGHT AND RAISED FLUSH W/ TOP OF COVER. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% MORE OR LESS THAN THE APPROXIMATE WEIGHT SPECIFIED. CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 35 AND AASHTO M306. THE BEARING SURFACES OF THE FRAMES AND COVERS SHALL BE MACHINED AND THE COVERS SHALL SEAT FIRMLY WITHOUT ROCKING. ALL DIMENSIONS SHALL HAVE A 1/16" TOLERANCE.

DETAIL NO. 424-1 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | 24" CAST IRON WATERTIGHT MANHOLE FRAME AND COVER | REVISED 01-01-2020 | DETAIL NO. 424-1

DETAIL NO. 426 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | DROP SEWER CONNECTIONS | REVISED 01-01-2007 | DETAIL NO. 426

NOTES:
1. ELECTRONIC MARKER SHALL BE A 3M MODEL 1424-XR/iD [4" DIAMETER SELF LEVELING MARKER BALL GREEN IN COLOR] OR APPROVED EQUAL OR AS REQUIRED BY THE LOCAL AGENCY.
2. MARKER SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S DIRECTIONS, 2' BACK FROM THE END OF THE SEWER SERVICE STUB AND CINCH TIED TO PIPE OR ABOVE PIPE AS REQUIRED BY LOCAL AGENCY. AN ADDITIONAL MARKER SHALL BE INSTALLED AT EACH SERVICE STUB BEND.
3. ELECTRONIC MARKER SHALL BE RESTORED BY CONTRACTOR IF DISTURBED WHEN PRIVATE SERVICE LINE CONNECTION IS INSTALLED.
4. MARKER SHALL BE USED IN ADDITION TO A 2"x4" METAL STUD.
5. CONSTRUCTION DETAIL APPLIES WHERE CONTRACTOR BUILDS HOUSE CONNECTION. TAP EXTENDS TO PROPERTY LINE IN ALLEYS OR STREETS OR TO EASEMENT LINE.
6. SIZE OF TAP SHALL BE DESIGNATED ON PLANS.
7. CONSTRUCT TAP AT MINIMUM SLOPE IF COVER WILL BE LESS THAN 5' AT PROPERTY LINE.
8. ALL FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D-2321. THE CONTRACTOR MAY VARY FROM THE DRAWING TO USE THE APPROPRIATE WYES, TEE-WYES AND BENDS TO ENSURE NO MISALIGNMENT OF THE PIPE AND FITTINGS. BLOCK OR BRACE FITTINGS JOINTS TO ENSURE ZERO DEGREES ANGULAR JOINT DEFLECTION.
9. END OF TAP TO BE SEALED AND MARKED AS NOTED.

DETAIL NO. 440-1 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | TYPE 'A' - SEWER BUILDING CONNECTION ELECTRONIC BALL MARKERS (STANDARD) | REVISED 01-01-2007 | DETAIL NO. 440-1

NOTES:
1. FOR WALLS REQUIRING SAFETY RAIL, MIN. WALL THICKNESS IS 8". SEE DETAIL 145 FOR ADDITIONAL REQUIREMENTS.
2. FOR BLOCK WALLS REQUIRING SAFETY RAIL, SEE DETAIL 145, NOTE 8.

DETAIL NO. 501-1 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | HEADWALL | REVISED 01-01-2020 | DETAIL NO. 501-1

DOUBLE PIPE HEADWALL

ELEVATION

CONCRETE MASONRY UNITS (BLOCK) HEADWALLS JOINED WITH CEMENT MORTAR PLASTERED BOTH SIDES OF WALL FULL HEIGHT AND SHALL BE CURED PER SECT. 726.

NOTES:
1. ALL CONCRETE SHALL BE CLASS 'A' PER SECTION 505 AND 725.
2. CONCRETE MASONRY UNITS (BLOCK) PER SECTIONS 510, 775 AND 776.
3. CONCRETE REINFORCEMENT SHALL BE NO.4 BAR 12" O.C. BOTH WAYS.
4. FOR WALLS REQUIRING SAFETY RAIL, MIN. WALL THICKNESS IS 8". SEE DETAIL 145 FOR ADDITIONAL REQUIREMENTS.
5. FOR BLOCK WALLS REQUIRING SAFETY RAIL, SEE DETAIL 145, NOTE 8.

HEADWALL DIMENSIONS

*NOMINAL PIPE SIZE	L^1	L^2	L^3	L^4	L^5
12"	1'-4"	2'-0"	3'-8"	0'-10"	2'-10"
15"	2'-0"	2'-8"	4'-0"	1'-0"	3'-0"
18"	2'-0"	3'-8"	4'-8"	1'-2"	3'-4"
21"	2'-8"	4'-0"	5'-4"	1'-3"	3'-8"
24"	2'-8"	4'-0"	5'-4"	1'-6"	3'-11"
30"	2'-8"	5'-4"	6'-8"	1'-10"	4'-7"
36"	3'-4"	6'-8"	8'-0"	1'-10"	5'-2"
42"	4'-0"	8'-0"	9-4"	2'-2"	5'-9"

* NOMINAL PIPE SIZE GIVEN FOR REINFORCED CONC. PIPE.

PIPE SIZE	W
12" – 21" INCL.	11"
24" – 42" INCL.	13"

DETAIL "A"

DETAIL NO. 501-2 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | HEADWALL | REVISED 01-01-2020 | DETAIL NO. 501-2

PIPE	DIMENSIONS							
I.D.	W		A	B	E	F	J	K
	SINGLE	DOUBLE						
18"	2'-6"	5'-2"	2'-8"	1'-3"	0'-9"	1'-3·5/8"	9"	1'-6"
24"	3'-0"	6'-6"	3'-6"	1'-7·1/2"	1'-1·1/2"	1'-11·3/8"	11"	2'-3"
30"	3'-6"	7'-10"	4'-4"	2'-0"	1'-6"	2'-7·1/4"	1'-1"	3'-0"
36"	4'-0"	9'-2"	5'-2"	2'-4·1/2"	1'-10·1/2"	3'-3"	1'-4"	3'-9"
42"	4'-6"	10-6"	6'-0"	2'-9"	2'-3"	3'-10·3/4"	1'-6"	4'-6"

NOTES:
1. HIGH POINT OF HEADWALL SHALL NOT PROJECT MORE THAN 3" ABOVE SLOPE.
2. ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 725.
3. ALL REINFORCING BARS SHALL BE NO. 4, 12" C TO C AND 3" CLEAR TO INSIDE OF FLOOR AND WALLS.
4. FOR WALLS REQUIRING SAFETY RAIL, MIN. WALL THICKNESS IS 8". SEE DETAIL 145 FOR ADDITIONAL REQUIREMENTS.

DETAIL NO. 501-5 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | HEADWALL DROP INLET | REVISED 01-01-2020 | DETAIL NO. 501-5

NOTES:
1. LINE PIPE AND STUB MAY BE CAST MONOLITHICALLY OR STUB MAY BE CAST ON TO LINE PIPE SECTION PRIOR TO COMPLETE CURING.
2. ALL LINE PIPE REINFORCEMENT SHALL BE TURNED UP INTO STUB.
3. THE VERTICAL STUB TO BE A.S.T.M. C-76 CLASS II WALL 'A' AND THE HORIZONTAL PIPE TO BE EQUAL TO STRENGTH OF PIPE ENTERING MANHOLE.
4. ALL REINFORCING STEEL SHALL CLEAR FACE OF CONCRETE BY 1-1/2" UNLESS SHOWN OTHERWISE.
5. CONCRETE ENCASEMENT SHALL BE CLASS 'A' PER SECT. 725 AND 505.

TABLE OF VALUES FOR 'F' & 'D'

D	51"	54"	57"	60"	63"	66"	69"	72"	78"	84"	90"	96"
F	13-3/4"	14-1/2"	15"	15-1/2"	16-1/4"	16-3/4"	17-1/2"	18"	19-1/4"	20-1/2"	21-3/4"	23"

DETAIL NO. 521 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | STORM DRAIN MANHOLE BASE (51" OR LARGER) | REVISED 01-01-1998 | DETAIL NO. 521

NOTES:
1. PRECAST CONCRETE CONES AND SECTIONS TO BE A.S.T.M. C-478.
2. BRICK MAY BE USED IN LIEU OF OR IN COMBINATION WITH CONCRETE ADJUSTING RINGS.
3. PRECAST CONCRETE SECTIONS 48" DIA PIPE MAY BE FURNISHED IN STANDARD LENGTHS.
4. UNLESS OTHERWISE SHOWN ON PLANS, USE (2) 2-1/2" PRECAST CONCRETE ADJUSTING RINGS ON IMPROVED STREETS AND (4) 2-1/2" RINGS ON UNIMPROVED STREETS.
5. MANHOLE STEPS SHALL BEGIN 2'-0" BELOW FINISHED GRADE AND CONTINUE AT 12" INTERVALS TO APPROXIMATELY 2' ABOVE MANHOLE SHELF. (AS REQUIRED BY AGENCY.)
6. CONCRETE SHALL BE CLASS A PER SECTION 725 AND 505.

2-1/2" RINGS SHALL BE REINFORCED WITH TWO 1/4" ROUND STEEL HOOPS; 6" AND 8" RINGS SHALL BE REINFORCED WITH FOUR 1/4" HOOPS, TIED WITH NO. 14 A.S.& W. GAUGE WIRE 8" O.C.

REINFORCED CONCRETE ADJUSTING RING

DETAIL NO. 522 | MARICOPA ASSOCIATION of GOVERNMENTS | STANDARD DETAIL ENGLISH | STORM DRAIN MANHOLE SHAFT | REVISED | DETAIL NO. 522

DLR Group

58405
STEPHEN C. IRWIN
10/07/20
Expires 9/30/2022

Shephard Wesnitzer Inc.

NORRIS DESIGN
6 East Aspen Avenue
Suite 200
Flagstaff, AZ 86001
P 928.233.3021
www.norris-design.com

NAU NORTHERN ARIZONA UNIVERSITY

Northern Arizona University - Student Athlete
High Performance Center, Building 73A
NAU Project: 09.731.191
1650 S. San Francisco Street, Flagstaff Arizona, 86011 (SAHPC-73A)

CONSTRUCTION DOCUMENTS
6.22.2020
Revisions
ASI03 09.04.20 TRADES, AHJ REVS
ASI05 10.07.20 TRADES, AHJ REVS

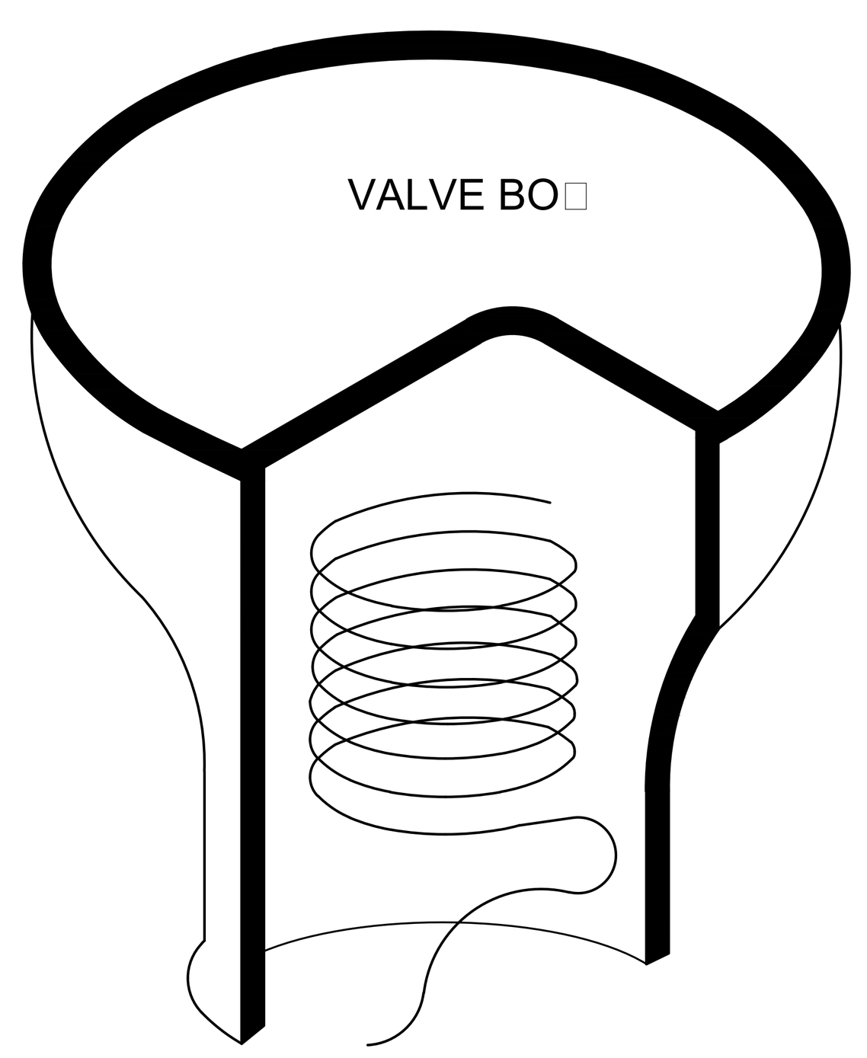
Attachment C2
to ASI05
dated 10/07/20

30-19131-00

CIVIL DETAILS

DT02

File location
Timestamp

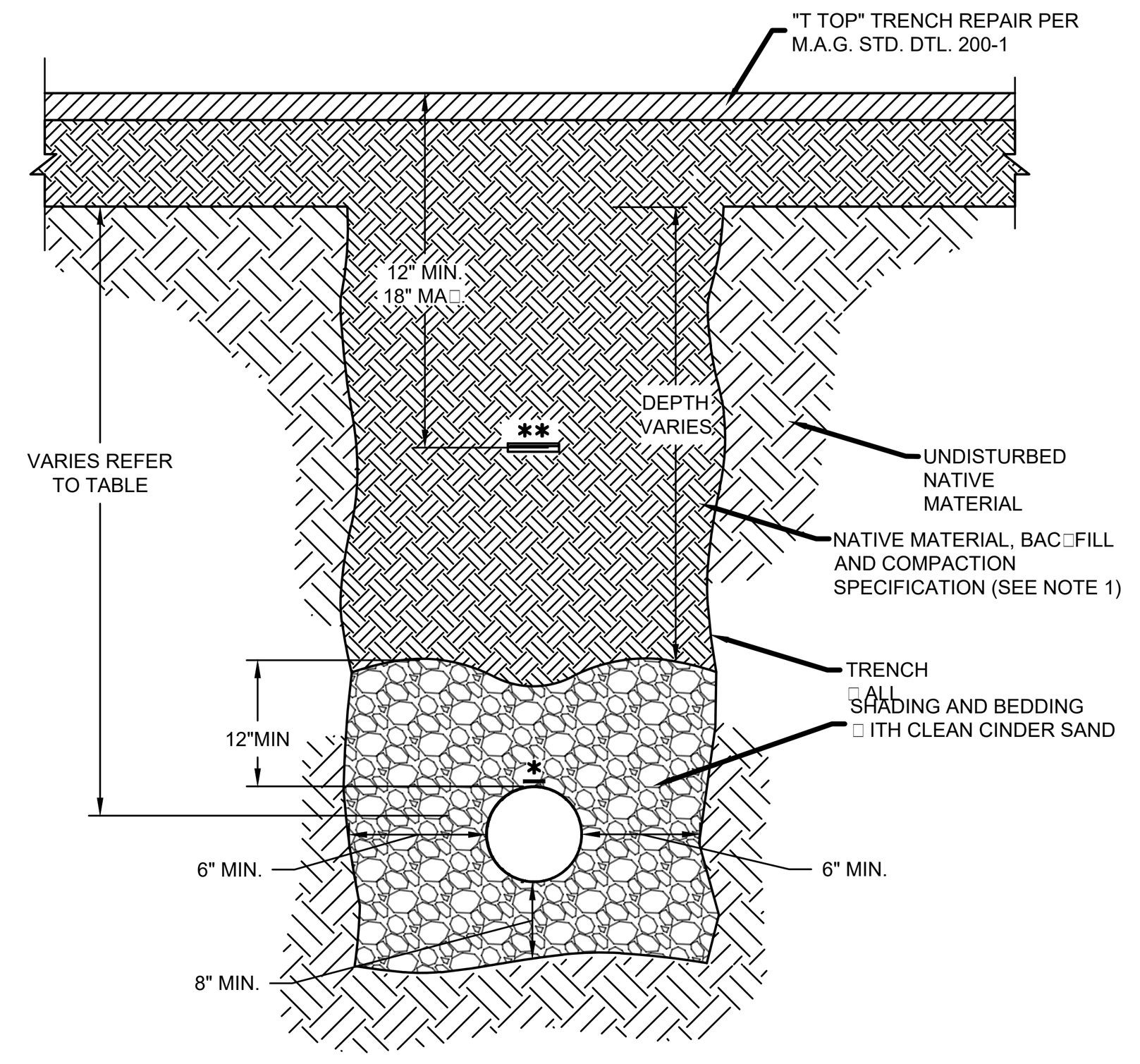


NOTES:

1. THE UF-600 TRACER WIRE SHALL BE A MINIMUM 8 FOOT OUTSIDE OF BOX WHEN EXTENDED, IN A CAST IRON VALVE BOX WITHOUT A VALVE.
2. TRACER WIRE FOR SEWER AND STORM MANHOLES SHALL COME UP INTO A VALVE CAN IN THE CONCRETE COLLAR.
3. COVER SHALL BE LABELED WATER, SEWER OR RECLAIM WASTEWATER.

J TRACE WIRE

N.T.S.



MINIMUM DEPTH	
WATER LINE	42"MIN
RECLAIM WATER	42"MIN
SANITARY SEWER	48"MIN
STORM DRAIN	36"MIN

NOTES:

1. NATIVE MATERIAL USED FOR BACKFILL SHALL BE SOUND EARTHEN MATERIAL FREE FROM BROKEN CONCRETE, BROKEN PAVEMENT, WOOD, OR OTHER DELETERIOUS MATERIAL WITH NOT PIECE LARGER THAN 1". BACKFILL SHALL BE PLACED IN HORIZONTAL LAYERS OF NOT MORE THAN 12" IN DEPTH AT DENSITIES IDENTIFIED IN MAG. 601 OR DIVISION 32.
2. ALL REQUIREMENTS USES NORTHERN ARIZONA UNIVERSITY DESIGN GUIDELINES AND TECHNICAL STANDARDS.
3. SLURRY SHALL NOT BE USED FOR BACKFILL.
4. UTILITY MARKERS REQUIRED FOR CURB LINES AND CONCRETE WALKWAYS PER NAU DGTS DIVISION 33 11 00..

* 12 AWG SOLID COPPER TRACER WIRE TAPED TO THE TOP CENTER OF THE GAS MAIN.

** 3" WIDE WARNING TAPE (12" TO 18" BELOW GRADE)

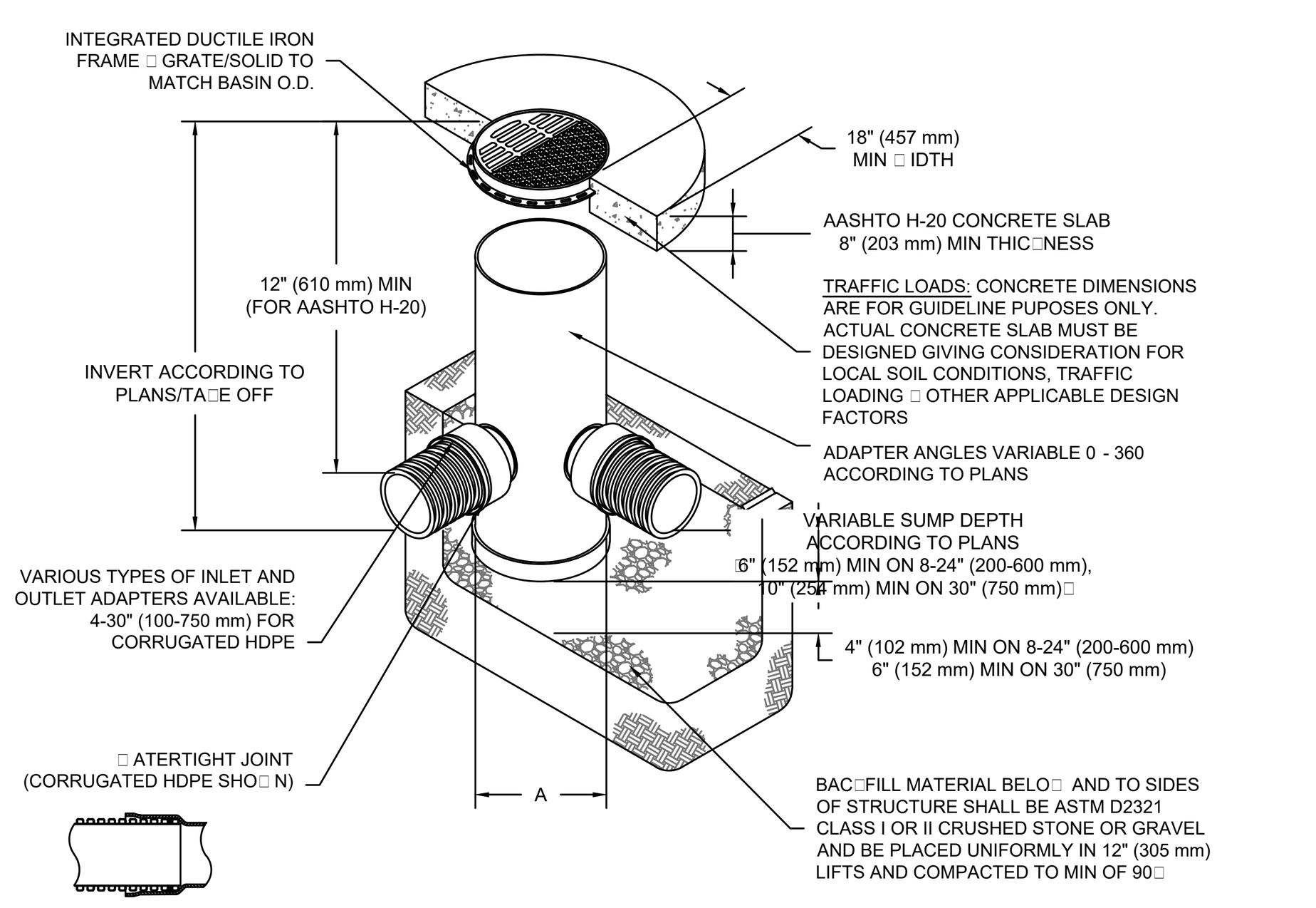
I NAU TRENCHING DETAIL
UNDERGROUND UTILITIES

N.T.S.

NOTES

1. 8-30" (200-750 mm) GRATES/SOLID COVERS SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
2. 12-30" (300-750 mm) FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
3. DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS
4. DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D3212 FOR CORRUGATED HDPE (ADS & HANCOR DUAL WALL) & SDR 35 PVC
5. FOR COMPLETE DESIGN AND PRODUCT INFORMATION: **WWW.NYLOPLAST-US.COM**
6. TO ORDER CALL: **800-821-6710**

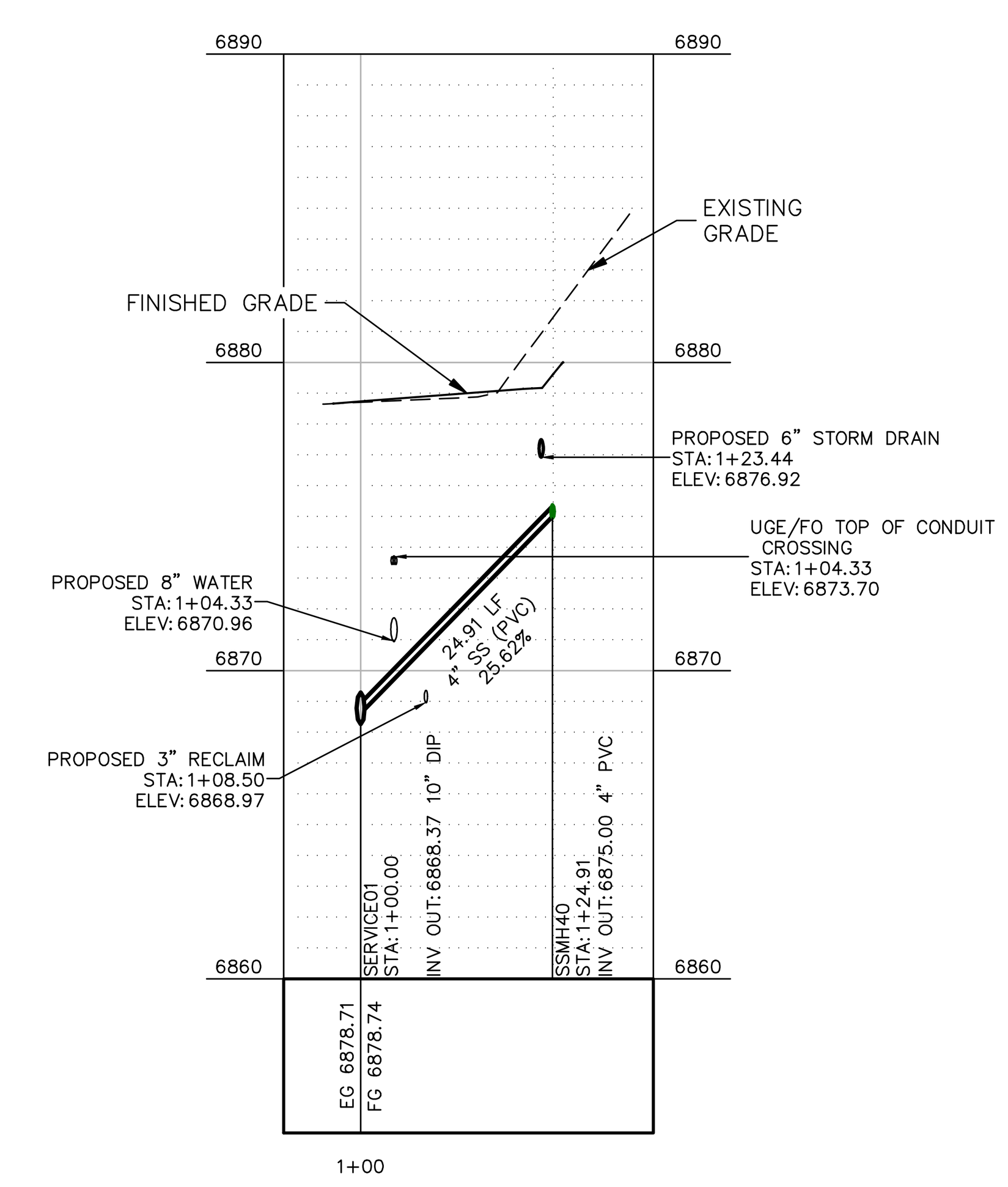
A	PART #	GRATE/SOLID COVER OPTIONS		
8" (200 mm)	2808AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
10" (250 mm)	2810AG	PEDESTRIAN LIGHT DUTY	STANDARD LIGHT DUTY	SOLID LIGHT DUTY
12" (300 mm)	2812AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
15" (375 mm)	2815AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
18" (450 mm)	2818AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
24" (600 mm)	2824AG	PEDESTRIAN AASHTO H-10	STANDARD AASHTO H-20	SOLID AASHTO H-20
30" (750 mm)	2830AG	PEDESTRIAN AASHTO H-20	STANDARD AASHTO H-20	SOLID AASHTO H-20



H ADS NYLOPLAST DRAIN BASIN

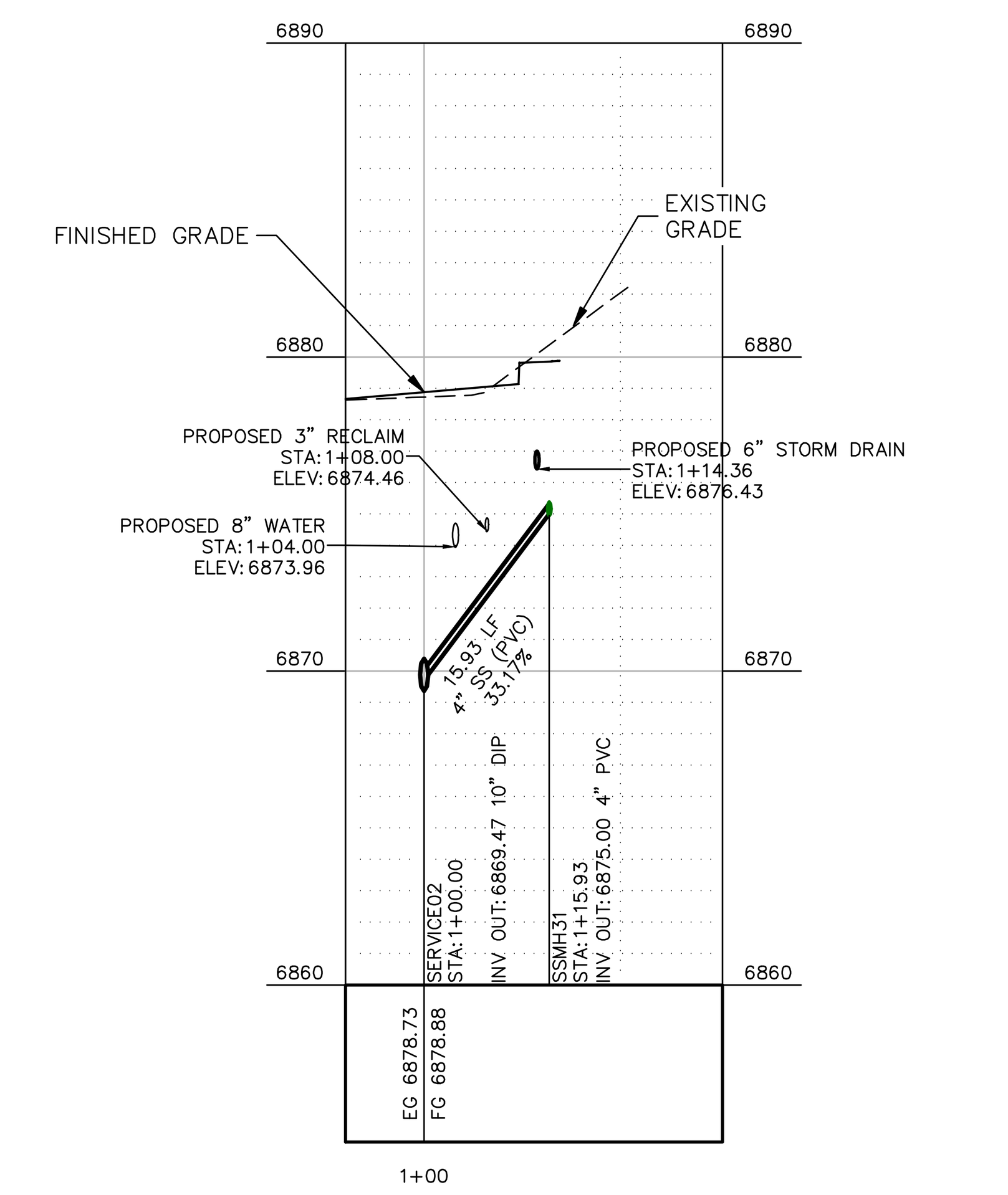
N.T.S.

SERVICE01



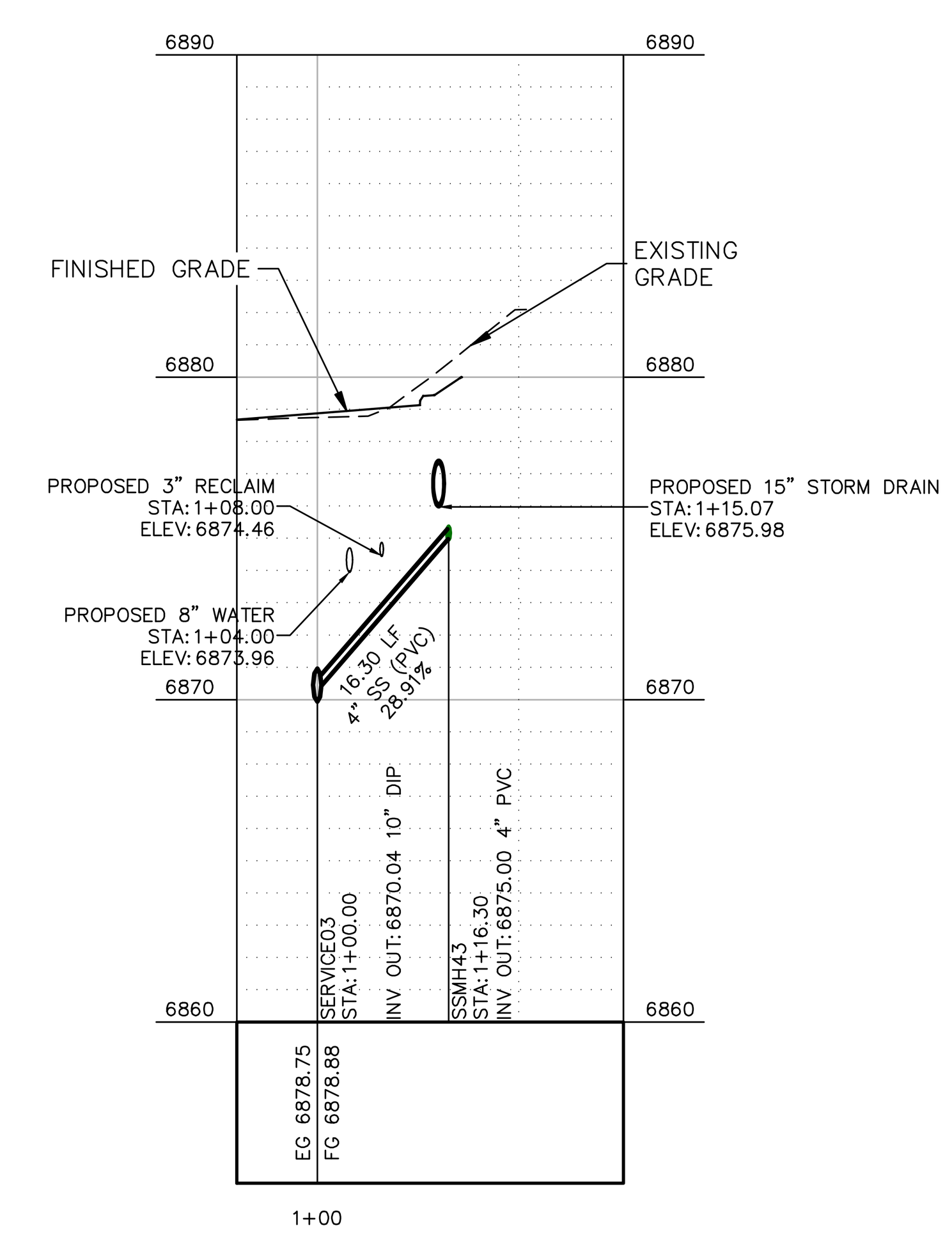
PROFILE VIEW
H:1"=20' V: 1"=5'

SERVICE02



PROFILE VIEW
H:1"=20' V: 1"=5'

SERVICE03



PROFILE VIEW
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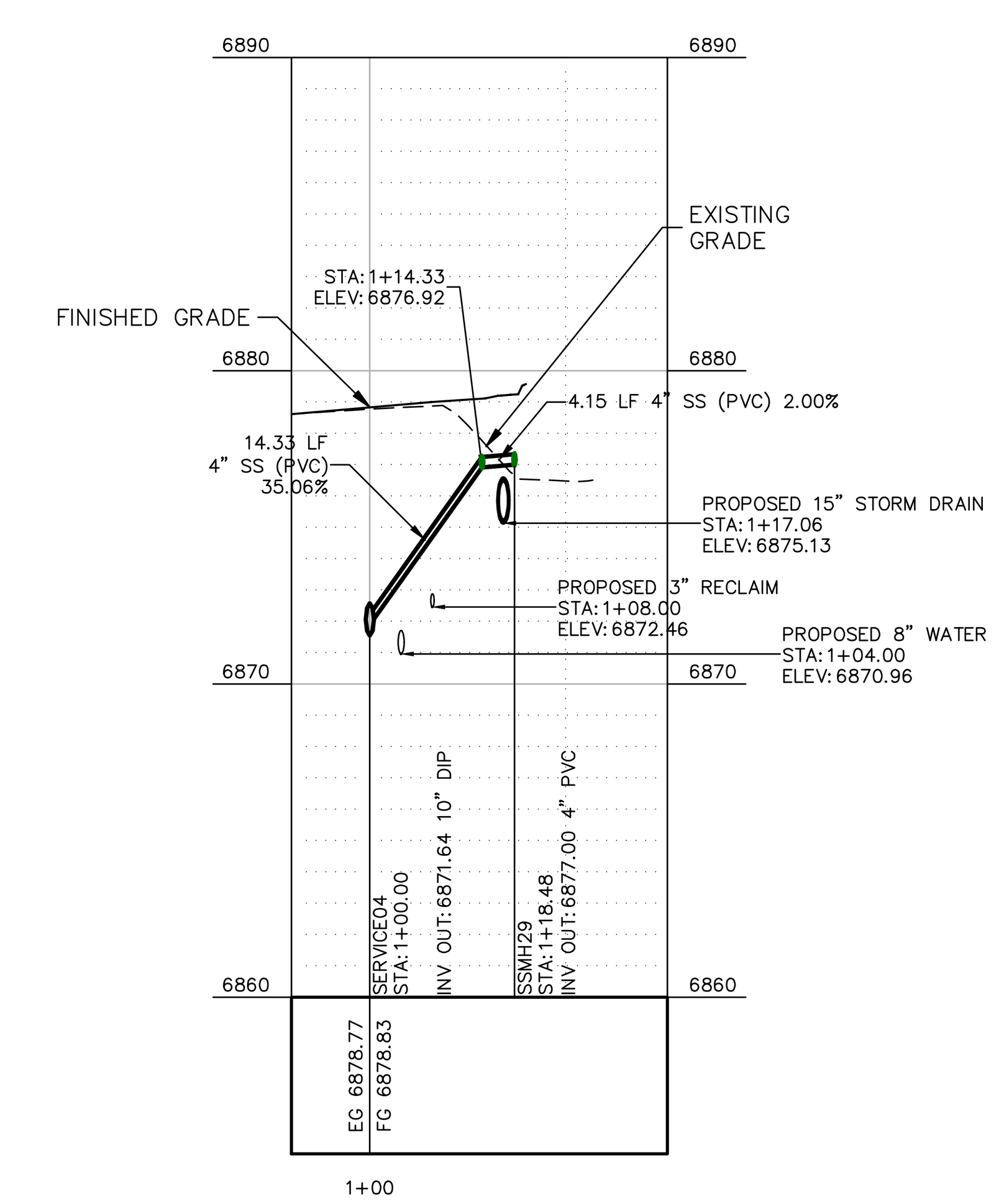
SERVICE04



PROFILE VIEW
H:1"=20' V: 1"=5'

DLR Group

SWI Shepherd Wesnitzer Inc
NORRIS DESIGN

NAU NORTHERN ARIZONA UNIVERSITY

Northern Arizona University - Student Athlete High Performance Center, Building 73A

NAU Project: 09.731.191
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CONSTRUCTION DOCUMENTS

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Attachment C3
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dated 10/07/20

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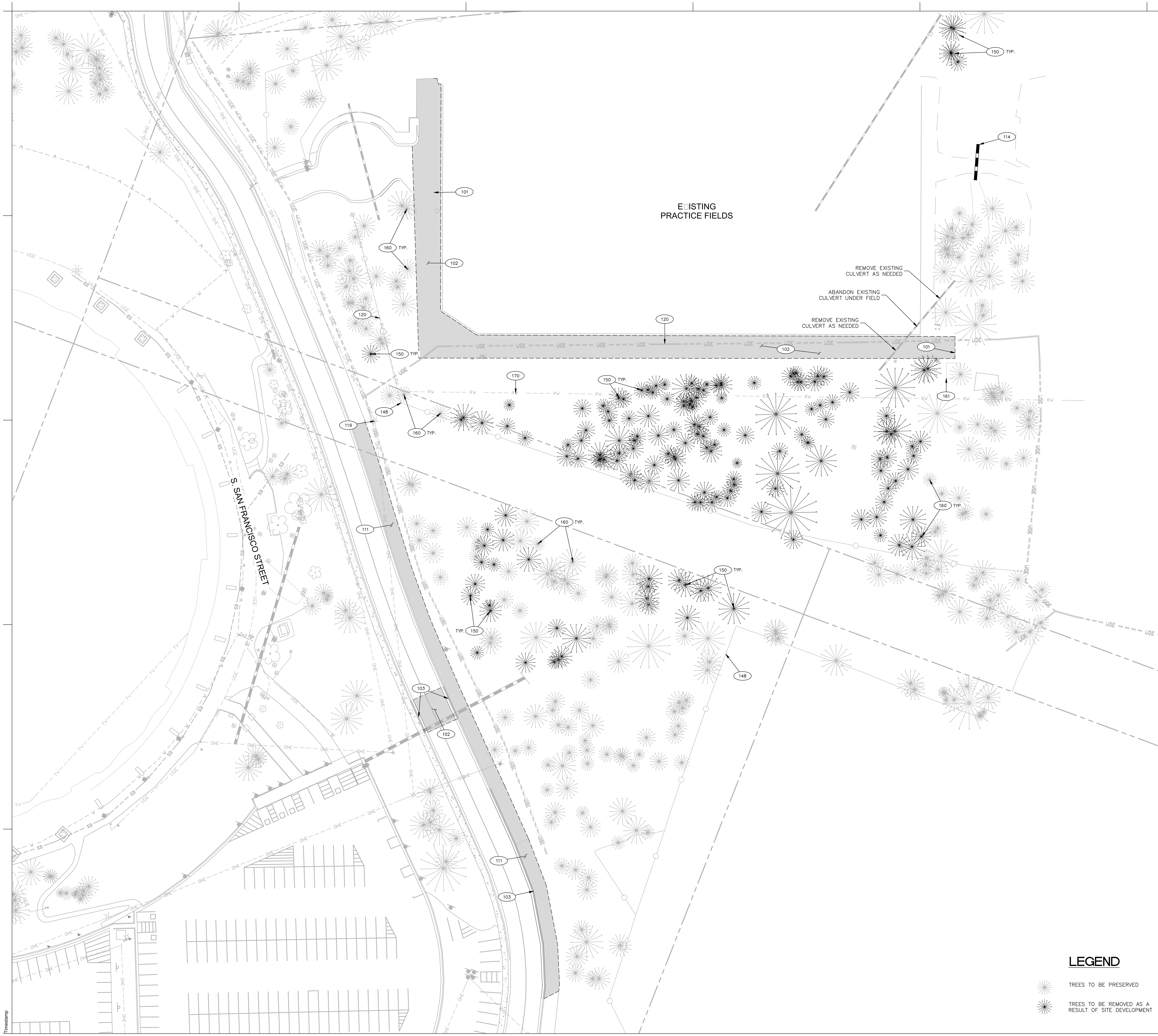
CIVIL DETAILS

DT03

File location
Timestamp



DEMOLITION NOTES

Note Number	Sheet Qty.	Unit	Note
100	-	NPI	SITE GRADING. CLEAR AND GRUB SITE PER M.A.G. SECTION 201, EARTHWORK PER PART 200. COMPLETE ROUGH GRADING AS REQUIRED TO CONSTRUCT THE PROJECT. UPON COMPLETION OF CONSTRUCTION, INCLUDING TOUCHING UP ACCESS DRIVE SURFACES, COMPLETE FINAL GRADING OF THE SITE. NATURAL AREAS AND CUT AND FILL SLOPES SHALL BE RESTORED IN ACCORDANCE WITH SPECIFICATIONS. DRAINAGE CHANNELS SHALL CONFORM TO THE PLANS.
101	1,478	LF	SAWCUT EXISTING IMPROVEMENTS TO LIMITS SHOWN ON PLANS.
102	1,735	SY	REMOVE AND DISPOSE OF EXISTING AC PAVEMENT PER NAU DGTS SECTION 32 10 00 AND M.A.G. SPECS. 336 & 350.
103	248	LF	REMOVE AND DISPOSE OF EXISTING CONCRETE CURB AND GUTTER PER NAU DGTS SECTION 32 16 00.
111	8,42 4	SF	REMOVE AND DISPOSE OF EXISTING AC PAVEMENT PATHWAY PER M.A.G. SPECS. 336 & 350.
114	31	LF	REMOVE AND DISPOSE OF EXISTING 18" CMP PER NAU DGTS AND M.A.G. SPECS. 336 & 350.
120	-	NPI	PROTECT EXISTING UTILITY IN PLACE
148	1,238	LF	REMOVE AND SALVAGE EXISTING FENCE PER NAU DGTS SECTION 32 31 00 PER LANDSCAPE PLANS
150	164	EA	REMOVE AND DISPOSE OF EXISTING TREE AND ROOTBALL PER M.A.G. SPECS. 336 & 350. CONTRACTOR TO REMOVE TREES FROM SITE THE SAME DAY THEY ARE DOWNED.
160	-	LS	INSTALL TREE PROTECTION FENCING PER NAU DGTS SECTION 01 56 39.
161	-	LS	REMOVE AND RELOCATE EXISTING SHED. COORDINATE WITH OWNER FOR RELOCATION.
170	449	LF	REMOVE AND DISPOSE OF EXISTING RECLAIM WATER LINE PER NAU DGTS SECTION 33 11 50.

DLR Group

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Attachment C4
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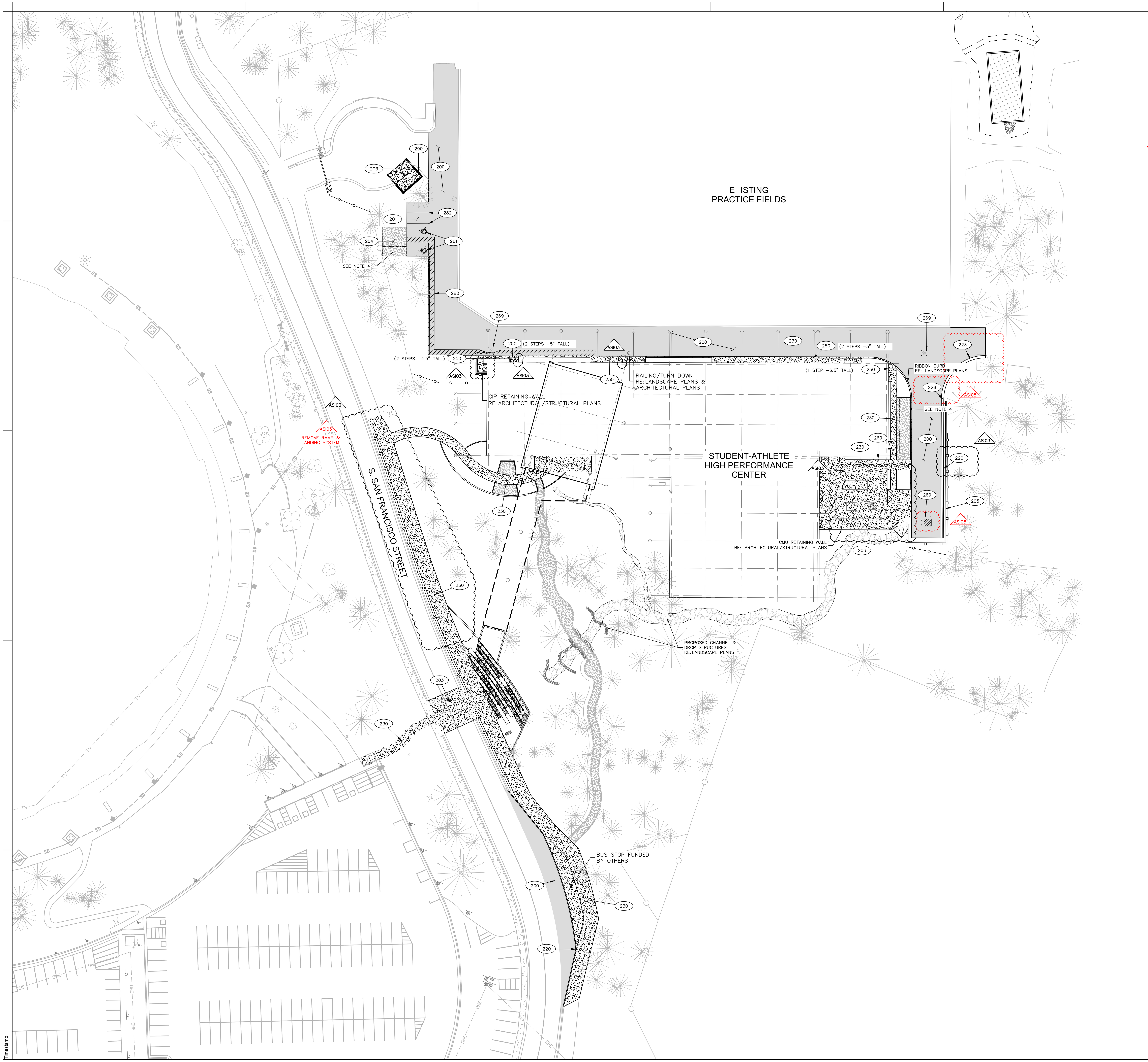
dated 10/07/20

30-19131-00

DEMOLITION PLAN

DM01



IMPROVEMENT NOTES

Note Number	Sheet Qty.	Unit	Note
200	2577	SY	CONSTRUCT HEAVY DUTY ASPHALT PAVEMENT PER DETAIL 'A' ON SHEET DT01 AND NAU DGTS SECTION 32 10 00.
201	810	SY	CONSTRUCT LIGHT DUTY ASPHALT PAVEMENT PER DETAIL 'B' ON SHEET DT01 AND NAU DGTS SECTION 32 10 00.
203	2825	SF	CONSTRUCT CONCRETE STRUCTURAL SECTION PER DETAIL 'C' ON SHEET DT01 AND NAU DGTS SECTION 32 13 13.01.
204	480	SF	CONSTRUCT GRAVEL AREA PER NAU DGTS SECTION 32 15 00.
205	165	LF	CONSTRUCT BELGARD TANDEM RETAINING WALL PER STRUCTURAL PLANS, DETAILS, AND SPECIFICATIONS.
220	303	LF	CONSTRUCT VERTICAL CURB AND GUTTER PER DETAIL 'E' ON SHEET DT01 AND NAU DGTS SECTION 32 16 00.
223	55	LF	CONSTRUCT ROLL CURB PER DETAIL 'T' ON SHEET DT01 AND NAU DGTS SECTION 32 16 00.
228	1	EA	CONSTRUCT CURB TRANSITION PER MAG STD DTL 222 AND NAU DGTS SECTION 32 16 00.
230	12867	SF	CONSTRUCT CONCRETE SIDEWALK PER DETAIL 'D' ON SHEET DT01 AND NAU DGTS SECTION 32 17 23, SIDEWALK WIDTH PER PLAN.
250	4	EA	CONSTRUCT STAIRS PER DETAIL 'S' ON SHEET DT01.
269	16	EA	INSTALL BOLLARDS (4' SPACING) AT LOCATION SHOWN PER M.A.G. STD. DTL. 140, TYPE 1.
280	1256	SF	PAINT NO PARKING AREA, 4" YELLOW DIAGONAL PAVEMENT MARKINGS, SPACED 2' APART PER NAU DGTS SECTION 32 17 23.
281	2	EA	PAINT UNIVERSAL "HANDICAPPED PARKING ONLY" SYMBOL IN ACCORDANCE WITH ADA STANDARDS PER NAU DGTS SECTION 32 17 23.
282	36	LF	4" WHITE PARKING STRIPING PER NAU DGTS SECTION 32 17 23.
283	2	EA	INSTALL HANDICAP PARKING SIGN (R7-8AZ) ON 'U' CHANNEL POST PER MUTCD AND MAG STD DTL 131, TYPE 'A'.
290	1	EA	CONSTRUCT TRASH ENCLOSURE PER TRASH ENCLOSURE WITH GATE DETAIL ON SHEET L-502 OF THE LANDSCAPE PLANS.

NOTES:
1. STRIP AND STOCKPILE TOPSOIL TO AS MUCH EXTENT AS POSSIBLE TO BE USED FOR LANDSCAPE TO SATISFY LEED SITE DEVELOPMENT PROTECT AND RESTORE HABITAT. REFER TO LANDSCAPE PLANS FOR MORE INFORMATION.
2. ALL CONCRETE FLATWORK SHALL HAVE AN INITIAL SOLOR REFLECTANCE INDEX (SRI) OF AT LEAST 29 TO MEET LEED HEAT ISLAND EFFECT – NONROOF. CONCRETE SAMPLES SHALL BE SUBMITTED FOR COMPLIANCE PRIOR TO CONSTRUCTION.
3. REFER TO SHEET A1.1A WITHIN THE ARCHITECTURAL PLANS FOR THE SNOWMELT ALTERNATE FOR THE WALKWAYS ON THE NORTH SIDE OF THE BUILDING.
4. PRELIMINARY CONEX BOX LOCATIONS. CONTRACTOR TO COORDINATE FINAL LOCATIONS WITH NAU.

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CONSTRUCTION DOCUMENTS
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Attachment C5
to ASI05
dated 10/07/20

30-19131-00

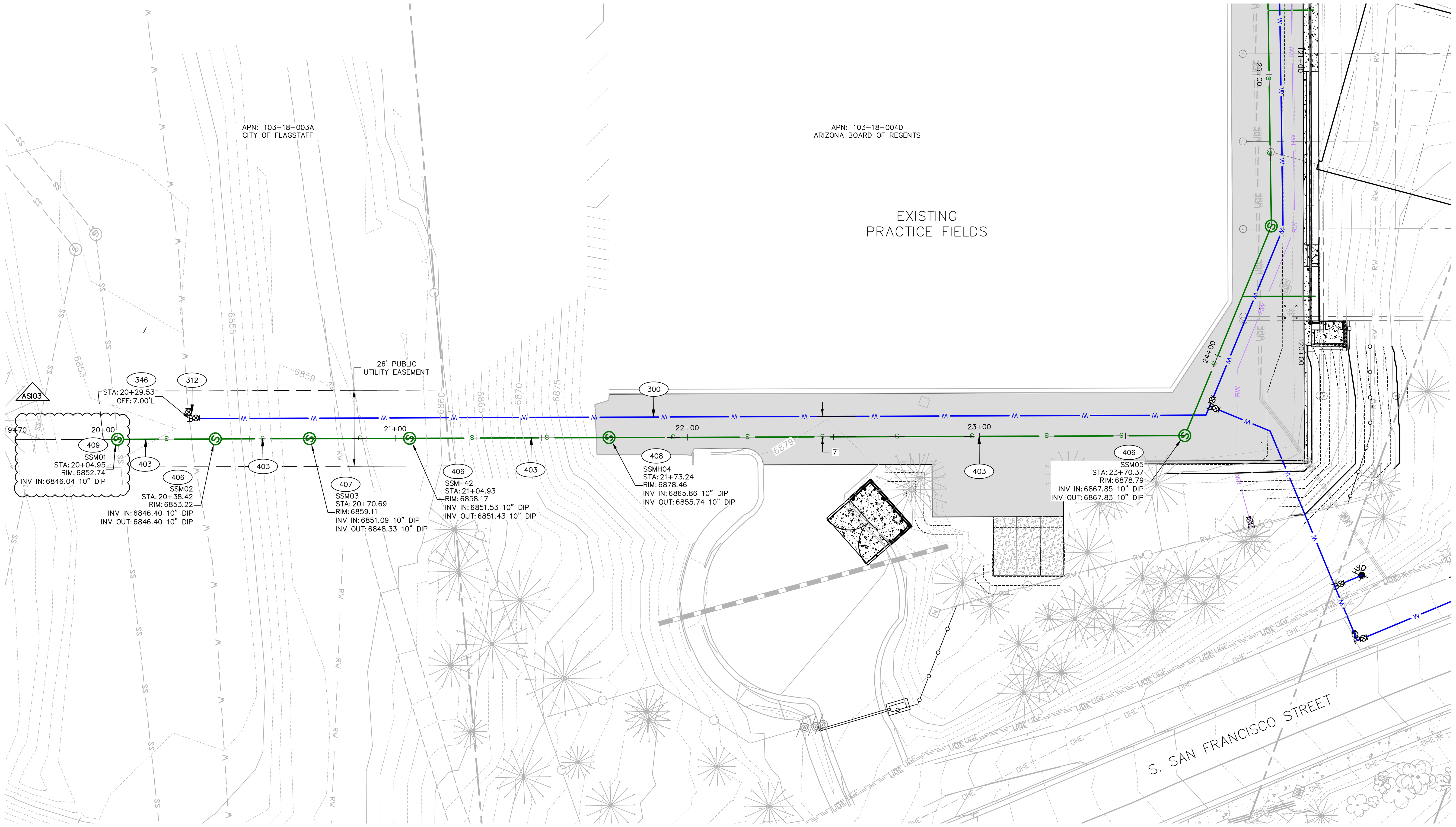
CIVIL
IMPROVEMENT
PLAN

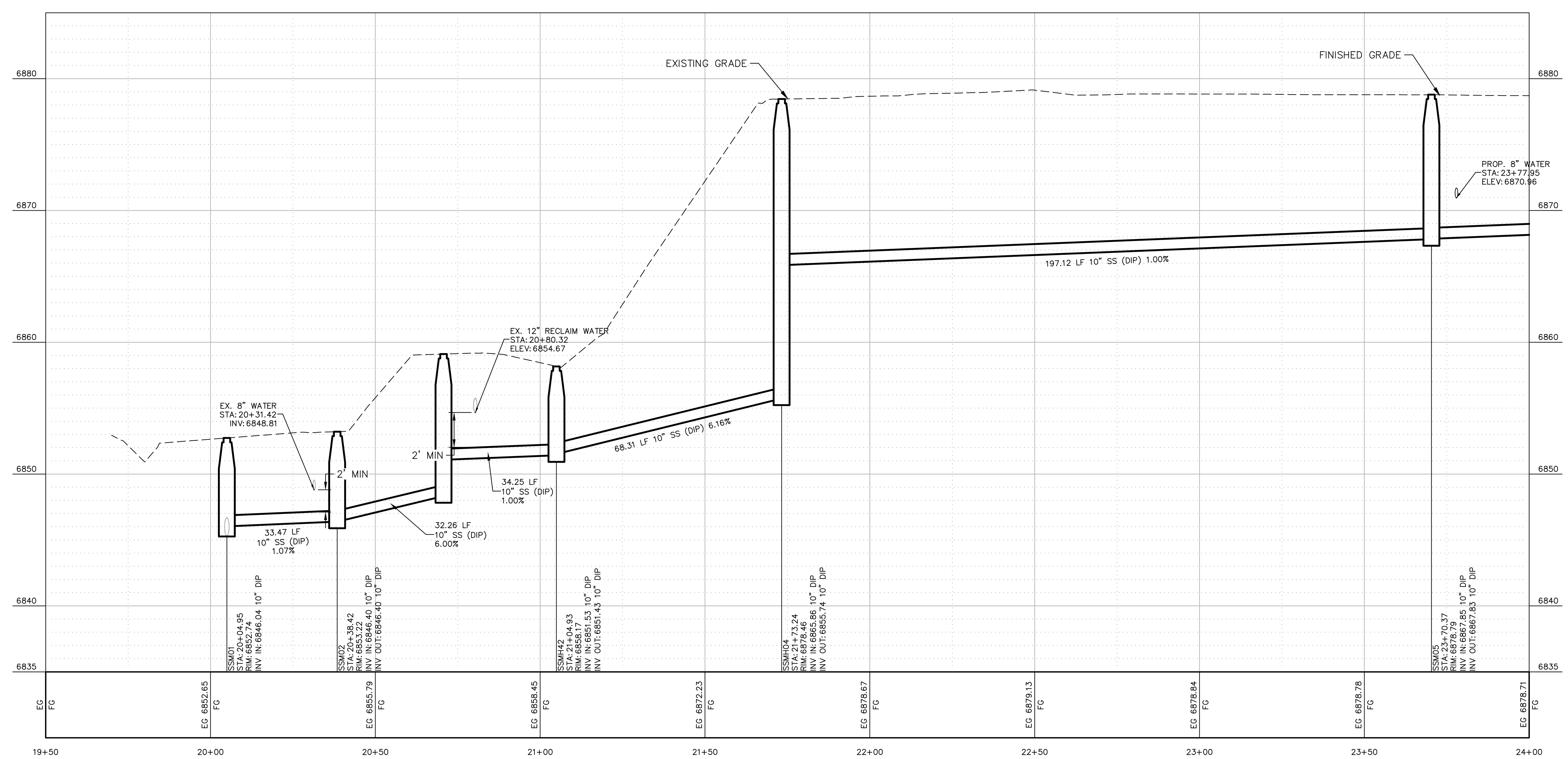
IP01

File location
Timestamp

UTILITY NOTES

Note Number	Sheet Qty.	Unit	Note
300	343	LF	INSTALL 8" WATERLINE (AWWA C-900) INCLUDING ALL APPURTENANCES PER NAU DGTS SECTION 33 11 16. INSTALL LOCATOR WIRE ALONG WATERLINE PER NAU DGTS 33 00 00. TRENCHING EXCAVATION, BACKFILLING AND COMPACTION PER TRENCHING DETAIL ON SHEET DT03.
312	1	EA	INSTALL 8" GATE VALVE DIP CLASS 250, EPOXY-COATED RESILIENT SEAT (INCLUDING VALVE BOX AND COVER) PER M.A.G. STD. DTL. 340 AND M.A.G. SPEC 610. ADJUST BOX TO FINISH GRADE PER C.O.F. STD. DTLS. 9-03-060 AND 9-03-062 ON SHEET DT01. THRUST BLOCK PER M.A.G. STD. DTL. 301 AND AS MODIFIED BY C.O.F. REVISIONS TO M.A.G SECTION 13-21-002-0380.
346	1	EA	INSTALL 8" TAPPING SLEEVE AND GATE VALVE PER NAU DGTS 33 11 16 AND M.A.G. SPEC. SECTION 630.
403	345	LF	INSTALL 10" (CL 350 DIP), SEWER MAIN PER NAU DGTS 33 31 13. TRENCHING, BACKFILLING AND COMPACTION PER TRENCHING DETAIL ON SHEET DT03.
ASI03 406	3	EA	INSTALL 48" DIA. SEWER MANHOLE PER NAU 33 31 13 & M.A.G. STD. DTL. 420. INTSTALL 24" FRAME & COVER PER M.A.G. STD. DTL. 424. ADJUST FRAME AND COVER TO FINISH GRADE PER M.A.G. DTL. 422.
407	1	EA	INSTALL 48" DIA. DROP SEWER MANHOLE PER NAU 33 31 13 & M.A.G. STD. DTL. 420 AND 426. INTSTALL 24" FRAME & COVER PER M.A.G. STD. DTL. 424. ADJUST FRAME AND COVER TO FINISH GRADE PER M.A.G. DTL. 422.
408	1	EA	INSTALL 60" DIA. DROP SEWER MANHOLE PER M.A.G. STD. DTL. 420, 426. INSTALL 30" FRAME & COVER PER M.A.G. STD. DTL. 424. ADJUST FRAME AND COVER TO FINISH GRADE PER M.A.G. DTL. 422.
ASI03 409	1	EA	INSTALL 60" DIA. SEWER PRE-CAST MANHOLE PER M.A.G. STD. DTL. 420 AND C.O.F. STD. DTL. 9-02-092 AND C.O.F. SECTION 13-09-0002-0007. INSTALL 30" FRAME & COVER PER M.A.G. STD. DTL. 424 AND C.O.F. STD. DTL. 9-03-062. ROTATE CONE SO MANHOLE COVER IS NOT IN CURB AND ADJUST FRAME AND COVER TO FINISH GRADE PER M.A.G. DTL. 422.





PROFILE VIE
H:1" 20 V: 1" 5

Northern Arizona University - Student Athlete High Performance Center, Building 73A

NAU Project: 09.731.191
1650 S. San Francisco Street, Flagstaff Arizona, 86011 (SAHPC-73A)

UNDERGROUND UTILITY PACKAGE

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Attachment C6
to ASI05
dated 10/07/20

30-19131-00

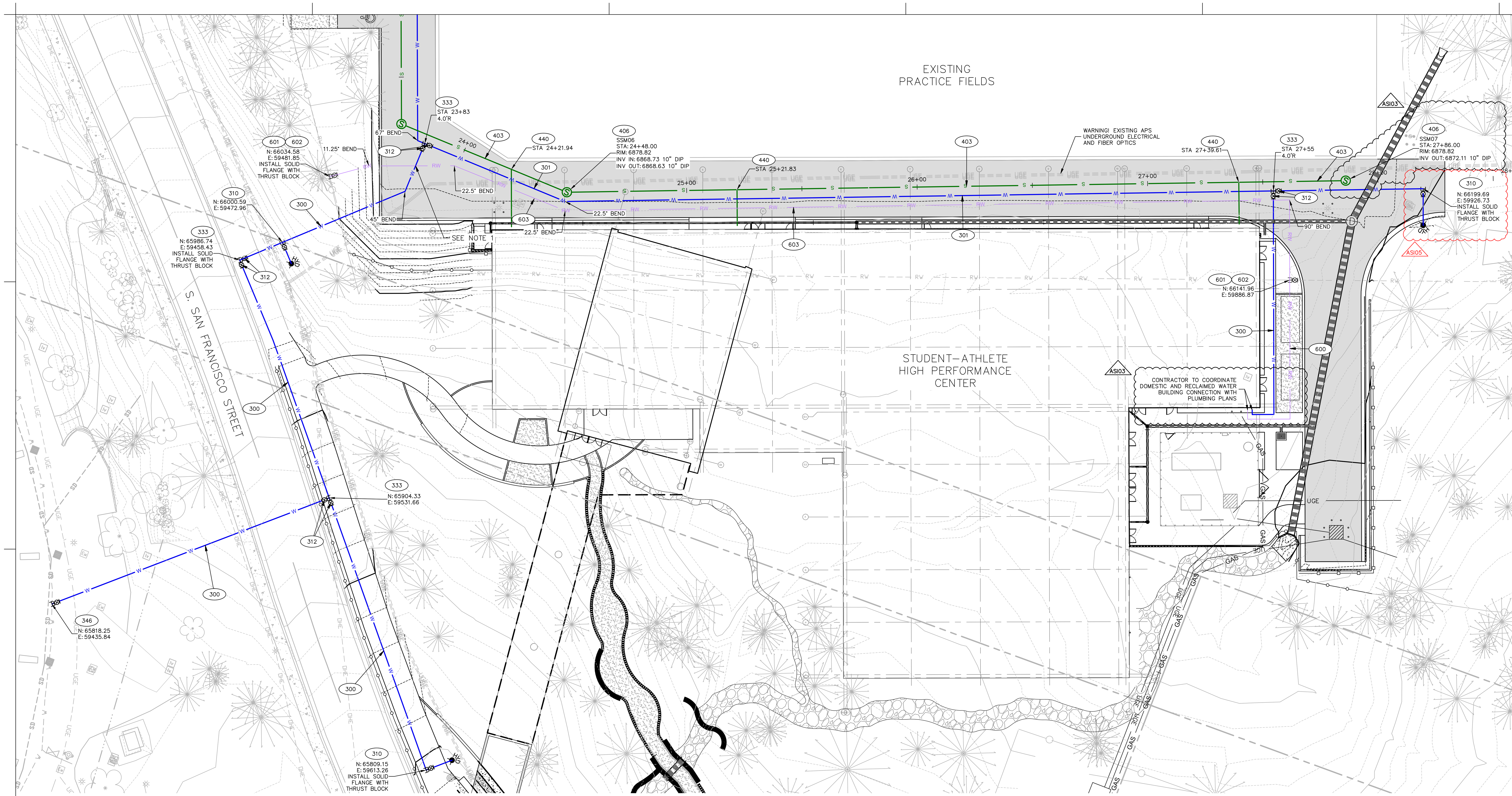
UTILITY PLAN-
ATER AND
SANITARY SE ER

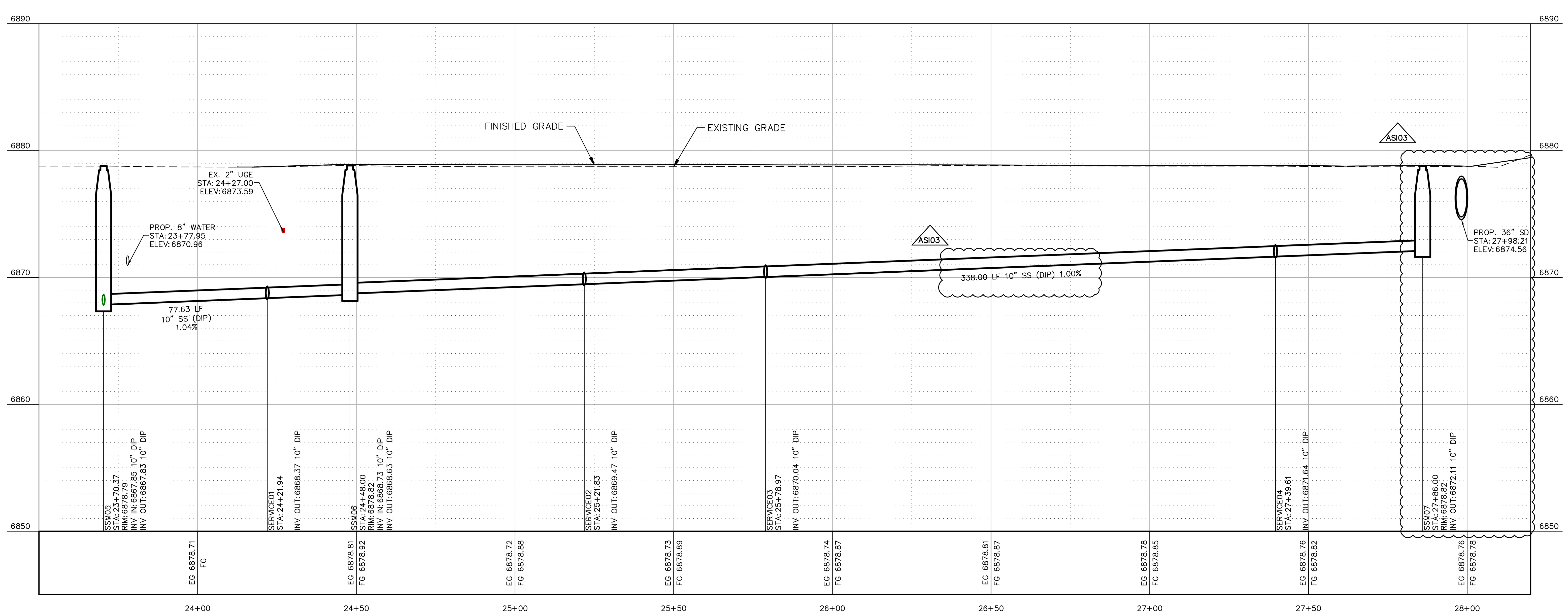
SCALE 1" : 20'

UT01

DLR Group

File location
Timestamp





PROFILE VIE□
H: 1"=20' V: 1"=5'

UTILITY NOTES

Note Number	Sheet Qty.	Unit	Note
300	442	LF	INSTALL 8" WATERLINE (AWWA C-900) INCLUDING ALL APPURTENANCES PER NAU DGTS SECTION 33 11 16. INSTALL LOCATOR WIRE ALONG WATERLINE PER PER NAU DGTS 33 11 00. TRENCHING EXCAVATION, BACKFILLING AND COMPACTION PER TRENCHING DETAIL ON SHEET DT03.
301	446	LF	INSTALL 8" WATERLINE (DIP CLASS 350 - RESTRAINED) INCLUDING ALL APPURTENANCES PER M.A.G. SPEC. SECTION 601 AND 610. INSTALL TRACER WIRE ALONG WATERLINE PER 33 00 00. TRENCH EXCAVATION, BACKFILLING AND COMPACTION PER TRENCHING DETAIL ON SHEET DT03.
310	3	EA	INSTALL NEW FIRE HYDRANT ASSEMBLY PER C.O.F. STD. DTL. 13-03-03. SET NEW VALVE, BOX, AND COVER TO FINISH GRADE.
312	8	EA	INSTALL 8" GATE VALVE DIP CLASS 250, EPOXY-COATED RESILIENT SEAT (INCLUDING VALVE BOX AND COVER) PER NAU DGTS SECTION 33 11 16. ADJUST BOX TO FINISH GRADE. THRUST BLOCK PER M.A.G. STD. DTL. 301.
333	4	EA	INSTALL 8"x8"x8" TEE DIP CLASS 250, WITH JOINT RESTRAINTS PER M.A.G. STD. DTL. 303.
346	1	EA	INSTALL 8" TAPPING SLEEVE AND GATE VALVE PER NAU DGTS 33 11 16 AND M.A.G. SPEC. SECTION 630.
403	432	LF	INSTALL 10" (CL 350 DIP), SEWER MAIN PER NAU DGTS 33 31 13. TRENCHING, BACKFILLING AND COMPACTION PER TRENCHING DETAIL ON SHEET DT03.
406	2	EA	INSTALL 48" DIA. SEWER MANHOLE PER NAU 33 31 13 & M.A.G. STD. DTL. 420. INTSTALL 24" FRAME & COVER PER M.A.G. STD. DTL. 424. ADJUST FRAME AND COVER TO FINISH GRADE PER M.A.G. DTL. 422.
440	4	EA	INTALL 4" SEWER SERVICE CONNECTION PER M.A.G. STD DTL 440. CONTRACTOR TO VERIFY BUILDING INVERT ELEVATIONS WITH PLUMBING PLANS. REFER TO SHEET DT03 FOR SEWER SERVICE PROFILES.
600	95	LF	INSTALL 3" RECLAIM WATERLINE (AWWA C-900) INCLUDING ALL APPURTENANCES PER NAU DGTS 33 11 50 AND M.A.G. SPEC. SECTION 610. INSTALL TRACER WIRE ALONG WATERLINE PER NAU DGTS 33 00 00. TRENCH EXCAVATION, BACKFILLING AND COMPACTION PER TRENCHING DETAIL ON SHEET DT03.
601	2	EA	INSTALL 3"x3"x3" TEE DIP CLASS 250, WITH JOINT RESTRAINTS PER M.A.G. STD. DTL. 303.
602	2	EA	INSTALL 3" GATE VALVE DIP CLASS 250, EPOXY-COATED RESILIENT SEAT (INCLUDING VALVE BOX AND COVER) PER NAU DGTS SECTION 33 11 50. ADJUST BOX TO FINISH GRADE. THRUST BLOCK PER M.A.G. STD. DTL. 301.
603	421	LF	INSTALL 3" RECLAIM WATERLINE (DIP CLASS 250) INCLUDING ALL APPURTENANCES PER NAU DGTS 33 11 50 AND M.A.G. SPEC. SECTION 610. RECLAIMED WATER LINE SHALL BE INSTALLED 2' UNDER THE DOMESTIC WATER LINE. LIMITS OF DIP SHALL BE 10' ON EITHER SIDE OF THE DOMESTIC WATER CROSSING. INSTALL TRACER WIRE ALONG WATERLINE PER NAU DGTS 33 00 00. TRENCH EXCAVATION, BACKFILLING AND COMPACTION PER TRENCHING DETAIL ON SHEET DT03.

NOTE:
1) PROPOSED RECLAIMED WATER LINE TO CROSS UNDER THE PROPOSED WATER LINE.

SCALE 1" : 20'

DLR Group

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UNDERGROUND UTILITY PACKAGE

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Attachment C7
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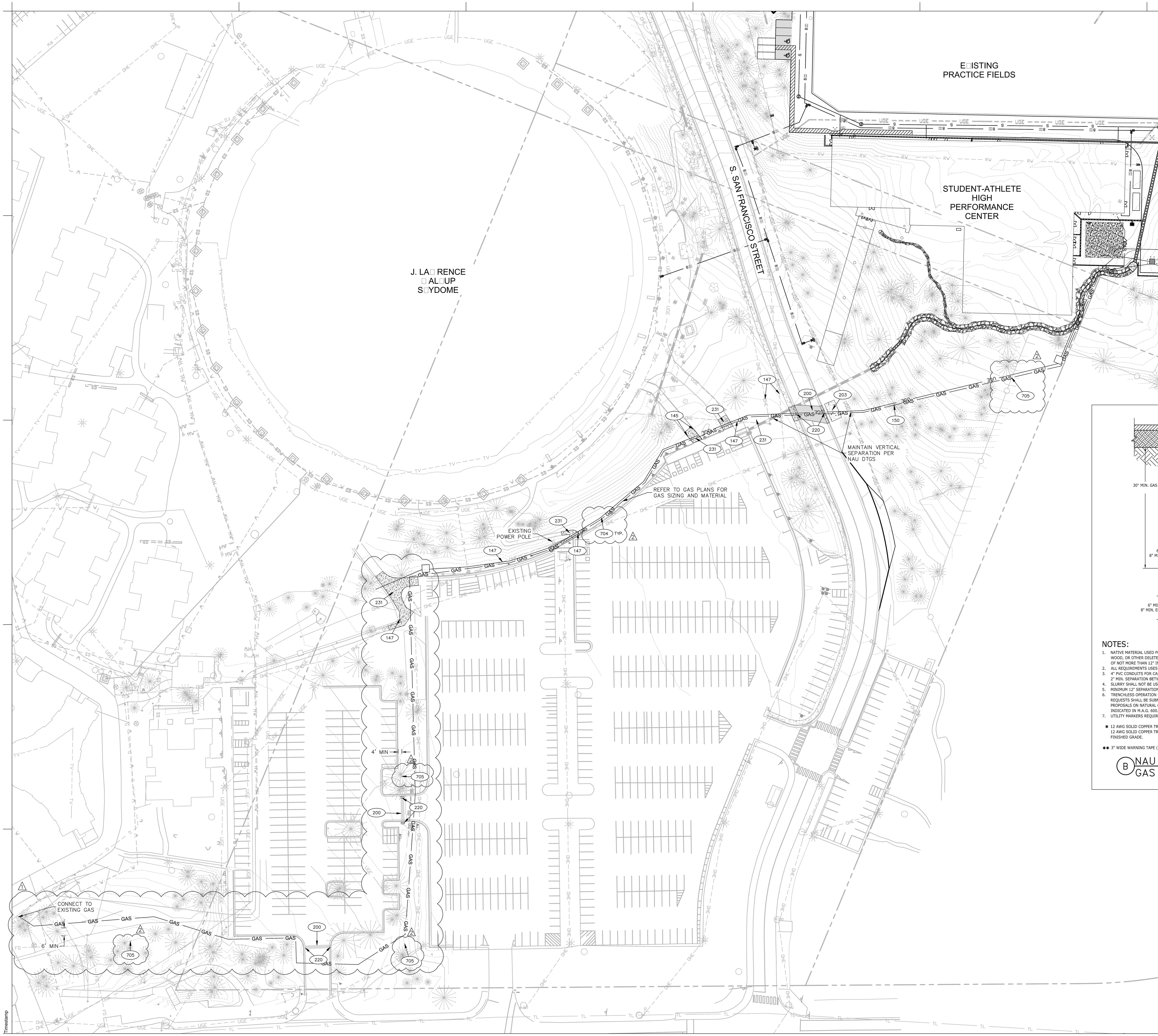
30-19131-00

UTILITY PLAN-
□ATER AND
SANITARY SE□ER

UT02

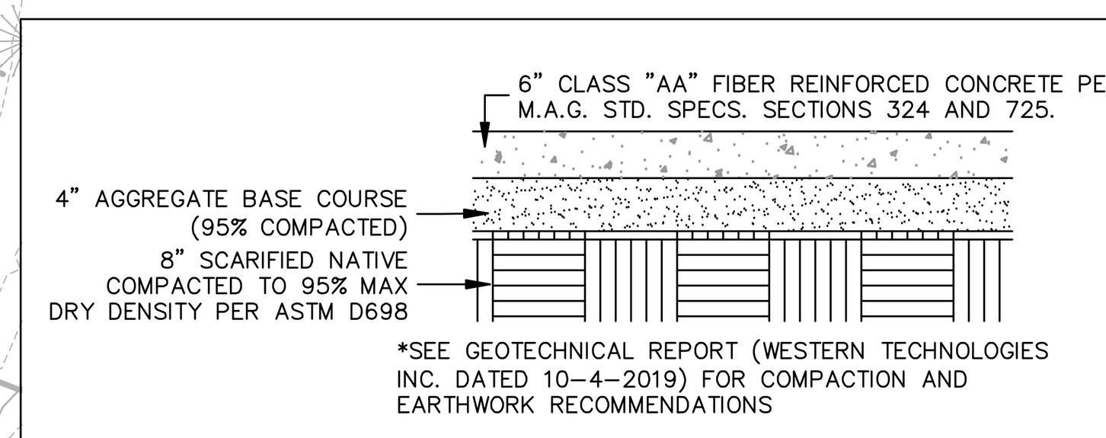
File location
Timestamp



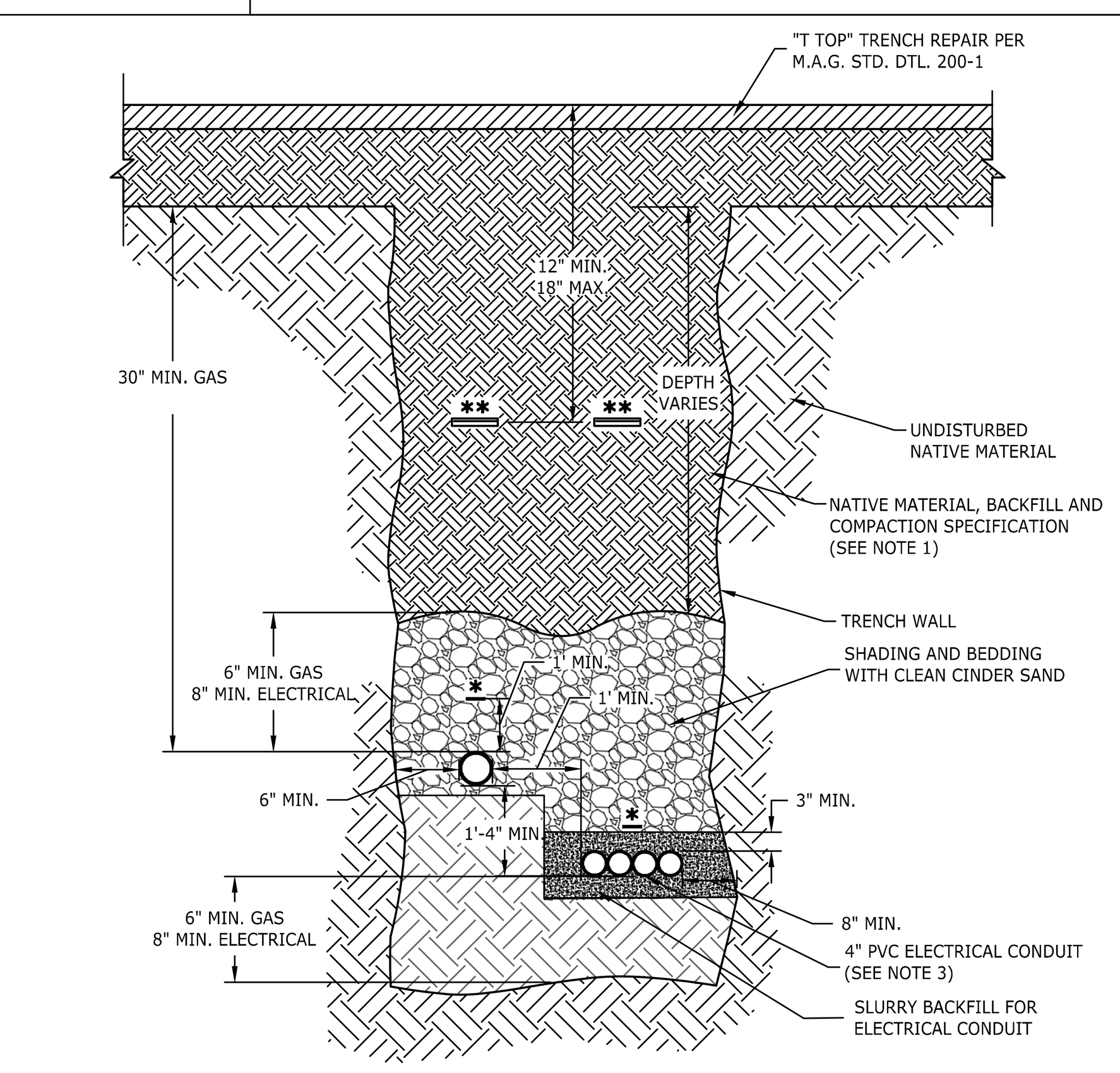
UTILITY NOTES

Note Number	Sheet Qty.	Unit	Note
145	35	LF	REMOVE, SALVAGE, AND REPLACE EXISTING HANDRAIL. NEW HANDRAIL SHALL MATCH EXISTING HANDRAIL ONSITE.
147	-	NPI	WARNING! OVERHEAD UTILITY. CONTRACTOR TO MAINTAIN SAFE VERTICAL DISTANCE FROM EXISTING OVERHEAD UTILITY.
150	1	EA	REMOVE AND DISPOSE OF EXISTING TREE AND ROOTBALL PER M.A.G. SPECS. 336 & 350. CONTRACTOR TO REMOVE TREES FROM SITE THE SAME DAY THEY ARE DOWNED.
200	81	SY	T TOP PER M.A.G. STD. DTL. 220-1. ASPHALT SHALL BE PER NAU DGTS DIVISION 32 12 00.
203	258	SF	CONSTRUCT CONCRETE STRUCTURAL SECTION PER DETAIL 'C' ON SHEET DT01 AND NAU DGTS SECTION 32 13 13.01.
220	56	LF	REMOVE AND REPLACE CONCRETE CURB AND GUTTER PER M.A.G. STD. DTL. 220-1, NAU DGTS DIVISION 03, AND DIVISION 32 13 13.01. CONTRACTOR TO REMOVE EXISTING CURB AND GUTTER TO NEAREST JOINT.
231	1,933	SF	REMOVE AND REPLACE CONCRETE SIDEWALK PER DETAIL A THIS SHEET AND NAU DGTS DIVISION 32 13 13.01 AND 31 13 13.02. CONTRACTOR TO REMOVE SIDEWALK TO NEAREST JOINT.
704	1	LS	RESTORE LAWN AREA AND IRRIGATION DISTRUBED BY PROJECT PER NAU DGTS 32 93 00 PLANTS.
705	1	LS	RESTORE ALL NATIVE GRASS AREAS DISTURBED BY THE PROJECT WITH NAU SHORT MEADOW BLEND. REFER TO NAU TECH STANDARDS SECTION 32 92 22 HYDROSEEDING. CONTRACTOR SHALL SUBMIT SEEDING MIX AND OPERATIONS SCHEDULE TO CAMPUS LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO HYDROSEEDING. REFER TO SECTION 32 92 22 PART 3 FOR REQUIRED SOIL AMENDMENTS.

NOTES:
1. REFER TO ELECTRICAL PLANS FOR INFORMATION ON ELECTRIC CONDUIT.
2. REFER TO NAU DGST FOR GAS SPECIFICATIONS.



A CONCRETE SIDEWALK SECTION N.T.S.



NOTES:
1. NATIVE MATERIAL USED FOR BACKFILL SHALL BE SOUND EARTHEN MATERIAL FREE FROM BROKEN CONCRETE, BROKEN PAVEMENT, WOOD, OR OTHER DELETERIOUS MATERIAL WITH NOT PIECE LARGER THAN 1". BACK WILL SHALL BE PLACED IN HORIZONTAL LAYERS OF NOT MORE THAN 12" IN DEPTH AT DENSITIES IDENTIFIED IN MAG. 601 OR DIVISION 32.
2. ALL REQUIREMENTS USES NORTHERN ARIZONA UNIVERSITY DESIGN GUIDELINES AND TECHNICAL STANDARDS.
3. 4" PVC CONDUITS FOR CAMPUS PRIMARY ENCASED IN 3000 PSI MINIMUM OF 3" OF INTEGRAL-COLOR RED CONCRETE SLURRY. PROVIDE 2" MIN. SEPARATION BETWEEN CONDUITS.
4. SLURRY SHALL NOT BE USED FOR BACKFILL.
5. MINIMUM 12" SEPARATION FROM GAS PIPE TO EDGE OF STEP.
6. TRENCHLESS OPERATION OR HORIZONTAL DIRECTIONAL DRILLING SHALL ONLY BE APPROVED ON A CASE BASIS BY UTILITY SERVICES. REQUESTS SHALL BE SUBMITTED IN ACCORDANCE TO M.A.G. 600 WITH DETAILS ON PULLING AND VERIFYING TRACER WIRE. PROPOSALS ON NATURAL GAS ARE TO BE REVIEWED BY THE ARIZONA CORPORATION COMMISSION. WORK SHALL BE PREFORMED AS INDICATED IN M.A.G. 600.
7. UTILITY MARKERS REQUIRED FOR CURB LINES AND CONCRETE WALKWAYS PER NAU DGTS DIVISION 33 11 00..

* 12 AWG SOLID COPPER TRACER WIRE TAPED TO THE TOP CENTER OF THE GAS MAIN.
12 AWG SOLID COPPER TRACER WIRE SHALL BE PLACED ABOVE BURIED ELECTRICAL CONDUITS AND DUCT BANKS 12" BELOW FINISHED GRADE.

** 3" WIDE WARNING TAPE (12" TO 18" BELOW GRADE) WITH THE APPROPRIATE LEGEND.(ELECTRICAL TELECOMMUNICATIONS AND GAS)

B NAU TRENCHING DETAIL N.T.S.
GAS LINE AND ELECTRICAL CONDUIT

SCALE 1" : 40'
0 20 40

DLR Group

SWI Shepherd | Wesnitzer Inc.

NORRIS DESIGN

NAU NORTHERN ARIZONA UNIVERSITY

Northern Arizona University - Student Athlete High Performance Center, Building 73A
NAU Project: 09.731.191
1650 S. San Francisco Street, Flagstaff Arizona, 86011 (SAHPC-73A)
UNDERGROUND UTILITY PACKAGE

CONSTRUCTION DOCUMENTS
6.22.2020
Revisions
ASI03 09.04.20 TRADES, AHJ REVS
ASI05 10.07.20 TRADES, AHJ REVS

Attachment C8
to ASI05
dated 10/07/20

30-19131-00

UTILITY PLANS-
GAS TRENCHING
PLAN

UT03

File location
Timestamp